OPERATIONS PLAN

THERMAL TREATMENT

NIKISKI, ALASKA

August 10, 2021

Prepared by:

Soil Treatment Technologies, LLC

SOIL TREATMENT
TECHNOLOGIES

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ACRONYMS AND ABBREVIATIONS

°C ....degrees Celsius
°F....................degrees Fahrenheit
AAC ....Alaska Administrative Code
ADEC ....Alaska Department of Environmental Conservation
ADNR ....Alaska Department of Natural Resources
ARC................Alaska Soil Recycling
BTEX..............benzene, toluene, ethylbenzene and xylenes
BTU ....British Thermal Units
CFR................Code of Federal Regulations
CO..................carbon monoxide
COC ....Chain of Custody
cy....................cubic yards
DC ....directional current
DRO ....diesel-range organics
EPA ....Environmental Protection Agency
GAC................granular activated carbon
gr/scf...............grains per standard cubic foot
GRO ....gasoline-range organics
HHV................higher heating value
HP ....horse power
LUST ....leaking underground storage tank
mg/m^3 ....miligrams per cubic meter
mL ....milliliter
mm ....millimeter
PAH ....polyaromatic hydrocarbons
PID ....photoionization detector
PPM................parts per million
QEP................Qualified Environmental Professional
QES................Qualified Environmental Sampler
RCRA ....Resource Conservation Recovery Act
RRO ....residual-range organics
SRU................soil thermal remediation unit
STT.................Soil Treatment Technologies, LLC
UST ....underground storage tank
VOCs..............volatile organic compounds
WELTS...........Well Log Tracking System

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1.0 INTRODUCTION

This Operations Plan is prepared by Soil Treatment Technologies, LLC. (STT) for the thermal remediation of petroleum-contaminated soil on the Kenai Peninsula. The thermal soil treatment facility will be set up in Nikiski, Alaska. STT is requesting Alaska Department of Environmental Conservation (ADEC) approval of this Operations Plan to operate a soil thermal remediation unit (SRU) as a Category D Offsite Treatment Facility receiving petroleum-contaminated soil from multiple projects/facilities for more than three years of operation. STT plans to operate the facility starting in 2021.

This plan has been prepared in accordance with ADEC Title 18 Alaska Administrative Code (AAC) 75.365 (18 AAC 75.365), 18 AAC 78.273 and the *Operation Requirements for Soil Treatment Facilities* (ADEC, 2013).

In accordance with 18 AAC 75.365 and 18 AAC 78.273, an owner/operator of an offsite or portable treatment facility must prepare an Operations Plan for ADEC approval prior to accepting or treating contaminated soil. This Operations Plan is protective of human health and the environment and includes the following:

1. Facility Diagram
2. Detailed Process Description
3. Post-treatment Sampling & Analysis Plan
4. Provisions for Complete Containment
5. Engineering Plans & Engineering Drawings for Contaminated Soil & Water Containment Structures
6. Site Monitoring Procedures

A public Soil Treatment Facility Operations Plan Notice will be prepared and submitted for ADEC approval. Once approved, the public notice will be posted to allow at least two weeks for public comments. An assessment of background contamination at the facility will be conducted and a *Baseline Environmental Assessment Report* will be submitted to ADEC for review. The following sections in this Operations Plan describe in detail the bulleted items listed above.

This Operations Plan will be updated and submitted to ADEC for review whenever substantive changes to the operation occurs. Substantive changes could include changes to items listed in 18 AAC 75.265(a)(1)(B) including expansion, reconfiguration of equipment or facility layout. Substantive changes could also include changes in federal or state laws, regulation, or policy impacting operations of the facility, or any other changes that could substantively impact operations.

1.1. Site Description

The proposed facility will be located at 52520 Kenai Spur Highway, Nikiski, Alaska 99611. The property is bordered by the Kenai Spur Highway to the north, vacant lot to the south, and commercial properties to the east and west. The nearest water body is a lake located 782 feet north from the site. Cook Inlet is located approximately 1 mile to the north. One water supply well was installed on the west side of the property with a total depth of 88 feet below ground surface (bgs) and a depth to water of 61.9 feet bgs. Based on the boring log from the well installation, groundwater was not encountered at a shallower depth than 61.9 feet bgs. A search of the Alaska Department of Natural Resources (ADNR) Well Log Tracking System (WELTS) showed only two other water supply wells within 500-feet of the facility perimeter (ADNR, 2021). The wells are 94 feet and 473 feet from closest property perimeter. The proposed facility location and water supply wells are shown in Figure 2 and the locations were taken from WELTS .

2.0 FINANCIAL RESPONSIBILITY

STT will provide financial responsibility as described in 18 AAC 75.365(a)(2)(A). Prior to the acceptance of soil for treatment, STT will provide the state the following:

1. Proof of corporate guarantee by Rescon Alaska and Pioneer Earthworks. The guarantee will be based on the maximum amount of soil that can be stored at the site at any one time. This includes 2000 tons of contaminated soil and 400 tons of suspect clean soil in each of the three post-treatment soil holding cells (3050 tons total for the facility). The cost for treatment of the soils is based on trucking the soils from the facility in Nikiski to Alaska Soil Recycling (ASR) in Anchorage for treatment. The cost for treatment and disposal of the soil is detailed in Attachment 2.
2. Proof of general liability and environmental pollution liability insurance for the facility.

Current insurance documents or other financial instruments will be provided to ADEC upon renewal.

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3.0 DETAILED PROCESS DESCRIPTION

This section gives a detailed description of the treatment process for:

- Solid Waste, Water and Air Process Streams
- Startup and Shutdown Procedure
- Maximum process Flow Rates
- Air Pollution Control Systems
- Projected Maximum Process Time for Complete Thermal Remediation
- Description of any Additives

3.1. Overview

When possible, soil will be screened at client's site to remove oversized material greater than 2-inch in diameter before it arrives at STT for treatment. If oversized material is present in significant quantities upon delivery, contaminated soil will be loaded into a screen plant, located inside the Quonset hut, to screen out material greater than 2-inch in diameter before entering the thermal processing stream (See Figure 2 - Facility Diagram) (ADEC, 2005).

Once the material has been screened, it will be stockpiled on a petroleum resistant, sealed, asphalt pad in a covered, enclosed, containment area awaiting treatment. A front-end loader will transfer the contaminated soil from the stockpile via a paved ramp to the 10-cubic yard (cy) feed hopper. The feed hopper discharges the material onto a feeder conveyor belt with a weigh bridge to the dryer. Once the material has had adequate retention time in the dryer, it is transferred to the baghouse. Any finer materials that are collected from the filters in the baghouse will be homogenized with this material and transferred to the soil conditioner by a 12-inch auger located under the filter housing. From the baghouse unit, the soil drops into the soil conditioner where water is introduced, cooling the material from approximately 600 degrees (^{o}) Fahrenheit (F) to approximately 250 ^{o}F. Water applied during this process is supplied from the on-site water supply well. The material then moves onto a radial stacker that piles the remediated material into stockpiles onto a steel plate pad where it will remain until post-treatment samples have confirmed the material has been fully remediated.

3.2. Solid Waste, Air and Water Process Streams

This section provides additional details for the various process streams for solid waste, air and water.

3.2.1. Oversized Material Handling

Oversized material, greater than 2-inches in diameter, that is screened from contaminated soil will remain on asphalt containment area within the Quonset hut. Oversized material will be thoroughly washed using a pressure washer to remove any residual soil material.

Residual sediment from oversized material will be included with contaminated media for thermal treatment. Rinse water will be captured in containment sump and will be treated as described below. Washed oversized material will be stored onsite with treated soils and will be used for beneficial reuse.

3.2.2. Solid Waste Process Stream

The presorted, contaminated soil is transferred from the storage stockpile to the 10 cy feed hopper using a front-end loader via a covered, paved ramp. The material is then transported from the feed hopper by weigh belt conveyor to the feed auger where it is fed into the counterflow rotary drum dryer that is 4.5-feet in diameter. The belt is run by a variable speed direct current (DC) drive so that the feed rate can easily be controlled. An automatic weigh scale is installed on the feeder belt between the hopper discharge and drum entrance. The weigh scale automatically records the belt speed and material weight, and electronically integrates the data to provide a totalized record of material passed over the feeder belt.

As the material moves through the dryer, it is heated to 600 ^oF. The dryer drum serves as a two-fold purpose; first to dry the material by transferring heat and secondly, to convey and transport the material from one end to the other. A 23.1 million British Thermal Units (BTU) natural gas fired burner supplies the heat for the drying process, and as the heat is transferred progressively between the hot gases and the solid feed, the moisture and other volatiles are evaporated. Heat transfer is further enhanced by the veiling action of the specially designed flights in the dryer. Evaporated water and hydrocarbon vapors along with the dust are carried away by the hot gases traveling in the opposite direction of material flow. The heated and dried material exits the drum at the burner end, while the exhaust gases are discharged at the feed end into the baghouse.

The dryer auger conveys the dried hot soil from the drum exit to an intermediate location where dust from the baghouse and knockout box is mixed with the hot feed. Exhaust gases containing vapors, moisture and dust particles are conveyed to a knockout box via ducting. The knockout box, which precedes the baghouse acts as a pre-cleaner where larger particles are removed from the gas stream due to inertia.

These gases are further cleaned in the baghouse where finer particles are filtered out by an array of high efficiency filter bags. These filter bags retain the dust and fine particles on their surface while allowing the clean air to pass on through a plenum to the fan. Dust retained on the filter surface builds up a cake and offers more resistance to the air flow. In order to keep flow smooth, the bags are cleaned by dislodging the dust cake by introducing a sequence of highly compressed air pulses (shock waves) at the top of the bags. The frequency and duration of the pulses is controlled by an electronic timer. The dislodged dust from the filters in the baghouse will be homogenized with the thermally treated material and transferred to the soil conditioner by a 12-inch auger located under the filter housing. The mixture is then conveyed away and discharged by a 6-inch auger to the soil conditioner where the material is cooled by spraying water. The water applied to the material evaporates during the cooling process. Once the material is cooled, it is transferred to a radial stacker where the treated soil is stockpiled on a welded steel surface, awaiting post-treatment sampling as described in Section 5.0.

Filtered gases in the process stream are pulled away by a centrifugal fan and transferred to the afterburner (thermal oxidizer) as described below in Section 2.2.2. A water mist injection port is located on the baghouse that is used to inject clean water into the airstream as needed to maintain a minimum relative humidity. The minimum relative humidity level is needed to ensure combustion does not occur in the baghouse.

3.2.3. Air Process Streams

Cleaned and dust free exhaust gases, which may contain volatile vapors are pushed into an afterburner section by the centrifugal fan. The afterburner consists of a refractory lined chamber equipped with a burner that directly fires into the chamber using natural gas. The afterburner is located at the exhaust intake manifold and heats up to 1,400 - 1,600 ^{o}F before it exits the exhaust stack. By raising the temperature of the exhaust gases, the vapors are ignited and incinerated. The after burner is mounted on two independent axles and can be transported separately with its own integral burner. Finally, clean gases are exhausted to the atmosphere at approximately 800^{o}F.

3.2.4. Water Process Stream

Once contaminated material is received at the STT facility and screened, it will be immediately be stored in an enclosed, paved pad. Contaminated material will be protected from rainfall, which eliminates the need for water management. Therefore, by design there is no water process stream associated with the SRU operated at the STT facility. In the event that the imported material is highly saturated, the pad will be constructed in such a manner that any water that enters the structure will be collected in a catch basin as shown in the engineering design of the pad (Attachment 1). Oversized material that is screened out of soil stockpiles will be washed using a pressure washer to remove any residual contaminated soil. The material will be washed inside the Quonset hut so that the runoff will drain into the catch basin. Collected water from the catch basin will be pumped onto the screened material awaiting treatment. The water blended in with the soil will be evaporated during the treatment process. In the unlikely event that the material will not soak up the water, the collected water will be treated through granular activated carbon (GAC) as described in the Engineering Plan. Treated water will be discharged onto the ground surface at least 100 feet away from any known drinking water wells or surface water bodies. Discharged treated water will be released in such a manner that it will infiltrate into the ground, will not create erosion or runoff, and will remain within the property boundaries.

Post-treatment pads will be covered when soil is not actively being treated. The post-treatment soil containment cells will be set at a gradient specified in the engineering plans so water will drain into a catch basin. The water collected in the catch basin will be inspected for odor and sheen before being discharged back onto the post-treated pile for evaporation. In the unlikely event that the material will not soak up the water, the collected water will be treated through GAC, collected and sampled prior to discharge onto the ground surface at least 100 feet away from any known drinking water wells or surface water bodies. More detailed water treatment procedures are described in the attached Engineering Plan.

3.3. Startup and Shutdown Procedure

The entire system is controlled by a Genco Genie™ Semi-Automatic Burner Control System. Burner management and process control is accomplished with a solid-state control system. The control is used to control the startup sequence, firing rate and safe operation of the dryer and afterburner. The dryer burner control includes a burner management system to prevent startup of the burner unless specific state conditions exist. The control will also shut down the burner if specific unsafe conditions exist. Temperature control function is proportional action around the preset balance of material temperature and burner position.

The afterburner control is interlocked with the exhaust fan, and the temperature control function is proportional action around the preset balance of stack gas temperature and burner position.

Startup

Power to the SRU is provided by electricity from Homer Electric Association that is hard wired to the property. Initially, the main power switch, the exhaust fan, fuel pump and air compressor are turned on. Power lights will indicate that the main power and exhaust fan are on and ready for operation. Then the dryer burner blower is powered on and after approximately 30 seconds of purge time, a ready light will come on. Once the indicator on the burner position meter is at zero, the discharge conveyor, mixer and baghouse augers, dryer, baghouse dust augers and dryer feed conveyor can all be powered on.

The power is then turned on to the Gen III and AR7. The dryer system will be purged by depressing the burner start button to ignite low fire. A low fire light will come on and a ready light will go off. The baghouse will then be preheated for 15 minutes at 250 ^{o}F. The thermal oxidizer blower burner is turned on and a blower light will come on. After approximately 30 seconds of purge time, a ready light will come on. Personnel will wait for the indicator on the burner position meter to go to zero before proceeding. The start button on the thermal oxidizer will be depressed to ignite low fire and the low fire light will come on and the ready light will go off. At this time the feed hopper gates will be opened, and the feed belt will be started at minimum speed.

With the complete plant running, the main fire switch will be turned to the “on” position and the main fire light will come on. With the auto/manual switch on dryer control in the “manual” position, the burner will be opened with the manual burner control switch. The burner remains open until the desired material temperature is reached on the meter. Then the auto/manual switch is turned to the “auto” position and the automatic control burner is operational. These steps will be repeated on the thermal oxidizer (afterburner) control to complete the startup process.

Shutdown

Shutdown of the system is initiated by stopping the feeder belt and closing the hopper gate. The main fire switch is turned off on the dryer burner and the main fire light will go out while the low fire light comes on. When the stop button is depressed, the low fire will go off and after a purge period, the ready light comes on indicating that the system is ready for re-ignition. The plant will be allowed to run for 10 minutes.

Then the thermal oxidizer main fire switch will be turned off at the burner. The main fire switch is turned off on the dryer burner and the main fire light will go out while the low fire light comes on. When the stop button is depressed, the low fire light will go off and after a purge period, the ready light comes on indicating that the system is ready for re-ignition. The exhaust fan, dryer and discharge system will run for at least 30 minutes to allow for plant cooling.

After the drum has emptied and cooled down, the discharge system will be stopped as well as the drum, exhaust fan and compressor. The final step in shutdown is to turn the main power off.

3.4. Maximum Process Flow Rates

Typical production throughput is approximately 25 tons per hour, but throughput can vary. The main factors that affect production throughput include the contaminant type and concentration, applicable cleanup levels, soil type and soil moisture level.

A typical operating shift is 12 hours per day, 6 days per week. During continuous operation, the process equipment is available for treatment about 11 hours per day, with 1 hour of down time for preventative maintenance.

3.5. Air Pollution Control Permitting and Equipment

On, 22 June 2021, ADEC Division of Air Quality (DAQ) issued Draft Minor Permit AQ1657MSS01 specifying the operating conditions and requirements for the soil remediation unit. The final permit, following the 30 day public comment period, is scheduled to be issued by 27 July 2021. A description of the emissions control systems, consisting of the baghouse and thermal oxidizer, and operating parameters are provided below.

Contaminated soil will be loaded into the rotary dryer drum and heated to 600°F for volatilization of the volatile organic compounds (VOCs) in the soil. From the dryer, the exhaust gas will flow through a primary dust collector into the baghouse for particulate matter removal. The baghouse is equipped with a 20 horsepower (HP) baghouse auger and a TECO AEHE Type, 50 HP induced draft fan. The primary air emission control function of the baghouse is the reduction of particulate matter; with a 99.8% particulate extraction efficiency. From the baghouse, the exhaust gas will enter the thermal oxidizer, for the destruction of the VOC and carbon monoxide (CO) emissions. The 23.6 million BTU burner in the thermal oxidizer will maintain an operating temperature of 1,562 °F with a higher heating value (HHV) of 1,000 BTUs per cubic foot (BTU/CF) to ensure an emissions destruction rate of 99%. The baghouse and thermal oxidizer will be in operation at all times while the system is active to ensure compliance with emissions standards.

In accordance with State Emission Standards, the permit stipulated the following operating requirements:

- Effluent exhaust shall not reduce visibility by more than 20% averaged over any six consecutive minutes.
- STT shall maintain and comply with its Fugitive Dust Control Plan to control the generation of fugitive dust.
- Particulate matter from effluent exhaust shall not exceed 0.05 grains per standard cubic foot (gr/scf) of exhaust gas corrected to standard conditions and averaged over a period of three hours.
- Sulfur compound emissions, expressed as SO2, shall not exceed 500 ppm averaged over three hours.

When requested by DAQ, STT shall conduct emissions source testing in accordance with the approved reference test methods for each respective emission parameter.

Prior to remediating soils contaminated with chlorinated hydrocarbons, STT shall conduct an initial source test using EPA Method 26A to determine the HCl emission rate. STT shall limit the emissions of hydrochloric acid (HCl) to no greater than 9.9 tons in any consecutive 12-month period to avoid classification as a major source of hazardous air pollutants (HAP). See the Air Quality Control Minor Permit (AQ1657MSS01) for additional details pertaining to the operating, record keeping and reporting requirements for the facility.

3.6. Projected Maximum Process Time for Complete Thermal Remediation

Soil process time is expected to be an average of 5-6 mins of retention time in the dryer. This time may vary based on contaminant type and concentration, applicable cleanup levels, soil type and soil moisture level.

3.7. Additives

Additives will not be used during any of the process streams associated with the thermal remediation process.

4.0 CONTROL AND CONTAINMENT OF CONTAMINATED SOIL

The following subsections explain the procedures and forms that STT will use to provide for complete containment of the contaminated soil before, during and after treatment until the contaminated soil meets applicable cleanup levels.

4.1. STT Requirements for Acceptance of Contaminated Soil

All soils accepted for thermal treatment must be characterized prior to arrival at the facility. Soils accepted for treatment must be analyzed by a laboratory that is certified through the ADEC Laboratory Certification Program and provide STT with an analytical laboratory report. The SRU at the STT facility will only accept petroleum-contaminated soil, which includes soil contaminants:

- Gasoline-range organics (GRO)
- Diesel-range organics (DRO)
- Residual-range organics (RRO)
- Petroleum-volatile organic compounds (PVOCs)
- Polyaromatic hydrocarbons (PAH)

STT will not accept any characteristic or listed Resource Conservation Recovery Act (RCRA) hazardous waste in accordance with 40 CFR Section 261. Generator knowledge can be used for petroleum contaminated waste where the source of the release is known and the waste is not mixed with waste from releases from other sources. For waste accepted on Generator Knowledge post treatment analyses will be the most stringent set of analyses described in the Field Sampling Guidance based on the source. Soil from industrial sites or other locations where the waste may have metals or contaminants that are not petroleum or petroleum constituents cannot be accepted on Generator Knowledge.

The following information must be provided to STT before acceptance and treatment of soil can begin:

- Copy of Spill Report to ADEC if applicable. Identify if spill is from a regulated underground storage tank (UST), a leaking UST (LUST) number or an ADEC Contaminated Site File number.
- Contaminated soils must have been generated by a known or declared responsible party who accepts responsibility for the contaminated soil.
- Written approval from ADEC to transport and treat soil at the STT site in Nikiski. Contaminated soil must be covered and transported in compliance with 18 AAC 50.0615.
- Estimated quantity of contaminated soil (cubic yards) to be delivered from each responsible party.

- The contaminants associated with the impacted soil and an analytical laboratory report with contaminant concentrations; STT will only except petroleum-contaminated soils. Non-petroleum soils may be accepted on a case-by-case basis through direct coordination with the ADEC.
- Soil type (i.e. peat, gravel, sand etc.).

STT will not allow any soil to be delivered to the site if the above requirements have not been met. The client is responsible for removing all wood, metal, plastic and other non-treatable material from the contaminated soil prior to delivery at the site. Any non-treatable material removed at the STT facility will be put in a suitable container and disposed of at an approved facility.

4.2. Delivery and Handling of Soil at the Site

Once the above listed information is provided, STT will review the information before any soil can be delivered to the site. As described above, all loads will arrive at the facility covered. All trucks will be weighed on a certified truck scale upon arrival at the STT facility. After the truck has been weighed, the truck will back into the covered storage building and dump its contents directly onto the petroleum resistant surfaced staging area. It will remain in this building and on the petroleum resistant surface until it is loaded into the feed hopper.

4.3. Control and Tracking Soils

Example forms used for control and soil tracking are included in Attachment 3. STT will assign unique Job Numbers to each site soil. This number will be used to track the soil from arrival at the facility, during treatment, sampling and removal from the facility. A Release Record will be used if soils are to be removed from the Treated Stockpile Area.

A weigh belt will be used for reporting soil volumes to ADEC and for billing purposes. A scale ticket will be generated hourly that can be submitted to ADEC with other reporting documents.

As treated soil exits the processor, the material will be placed in separate pile(s) of up to 400 tons each, on the area designated as “Treated Soil Stockpile Area” (See Figure 2 - Facility Diagram). The “treated soil pad” will consist of three different collection areas (stockpiles), separated by concrete barriers. Each stockpile will be marked with the Job Number, the date treatment was completed and post-treatment sample date.

Soil will be comingled to maximize soil storage pre- and post-treatment. Comingled soil will be tracked together from arrival at the facility, during treatment, sampling and removal from the facility. Each comingled stockpile will be marked with each corresponding Job Number, the date treatment was completed and post-treatment sample date.

4.4. Design of Soil Storage Cell for Untreated Soil

4.4.1. New Containment Cell Construction

STT will construct a Category D hard-surface, petroleum resistant contaminated soil storage and treatment area. The operational layout figure provided as part of the engineering plan (Figures 7, 8 and 9) depicts the soil storage cell designs and work area. STT will provide engineering plans, drawings and specifications of the soil containment cells, signed and sealed by an Alaska-registered professional engineer, as we intend to construct them. The engineering design is included in Attachment 1.

An Alaska-registered professional engineer or assistant will be on site during construction of the facility and will inspect and document the site installation process of the paved asphalt untreated soil containment cell. The construction of the contaminated soil storage cell is described below:

1) Stake out 60 feet by 100 feet for the asphalt pad.
2) Survey reference elevation.
3) Perform site in-situ soil assessment of asphalt pad location.
4) Remove frost susceptible soils to a depth as determined by on-site engineer based on soil-assessment. A minimum of 2” of in-situ soil will be removed.
5) Field screen and collect soil samples for laboratory analysis as required for baseline environmental assessment.
6) Grade sub-base as per engineering drawings water collection design.
7) Compact the 60 feet by 100 feet sub-base using roller compaction.
8) Place 1” minus aggregate base in lifts no greater than 6 inches.
9) Conduct as-built survey of elevation of the 1” minus base layer.
10) Compact 1” minus base material by roller compaction.
11) Machine pave 60 feet by 100 feet pad with two inches of asphalt.
12) Conduct as-built survey of elevation of asphalt layer.
13) Allow asphalt to cure 1 week before applying Enviroseal LAS-320™ asphalt sealer.

The pad provides a hard, petroleum-resistant surface that is resistant to structural damage by backhoe buckets, and front-end loader buckets. No steel tracked equipment will be used at this facility, only rubber tired/tracked equipment will be used on the paved surface to mitigate any structural damage that could occur.

4.4.2. Cover

The entire contaminated soil storage, oversized soil screening area and loading ramp will be permanently covered with a prefabricated steel Quonset Hut™. The Quonset Hut is composed of 20-gauge steel sections that overlap each other. The hardware used to connect each section have built-in rubber gaskets so that no water infiltration will occur from rain, snow, etc. The soil-receiving end of the Quonset hut will be open allowing for a well-ventilated area that is safe for workers to work inside.

4.4.3. Treated Soil Stockpile Storage Area

Treated soil will exit the SRU via a radial stacker and will fall onto a 40-feet by 40-feet steel plate that is lined 6-feet tall around the perimeter with concrete barriers for soil containment. Additionally, a 10" high barrier will be welded around three sides of each pad and a 2" high barrier across the entrance to the cell to ensure water does not runoff the pad. The pads will each be sloped towards the back of the pad where a corrugated plastic stand pipe will be located in the corner of the cell with a submersible pump for water removal. Additional water management information is detailed in Section 5.2.1 of the Engineering Plan.

There are three individual cells on this pad, allowing for stockpiles up to 400 tons in each cell. The soil will remain in their respective cells until post-treatment soil samples have verified that it is fully treated and is no longer deemed "contaminated". Material that is on the pad will be covered with a 6-millimeter (mm) reinforced poly liner to prevent any rain/snow from saturating the material and causing runoff. After the soil is no longer deemed "contaminated", it will be taken to a larger area on site where it will be used as backfill material for local projects.

4.4.4. Disposal of Treated Soils

Once the post-treatment material has met the applicable ADEC cleanup levels and final approval has been granted from ADEC, STT will notify the client. If the generator of the soil does not want the material, it will be stockpiled on-site (Attachment 1, Figure 2) and can be used by other contractors for various projects. STT will document the quantity, date, time and hauling contractor for the soil taken off-site on the Release Record.

4.5. Design of Soil Storage Cell for Post-Treated Soil

4.5.1. New Containment Cell Construction

An Alaska-registered professional engineer or assistant will be on site during construction of the facility and will inspect and document the site installation process of the steel plate post-treated soil containment cell. The construction of the post-treated soil storage containment cell is described below:

1) Stake out 40 feet by 40 feet for the quarter-inch steel plate pad.
2) Survey reference elevation.
3) Perform site in-situ soil assessment of post-treated soil containment cell location.
4) Remove frost susceptible soils to a depth as determined by on-site engineer based on soil-assessment. A minimum of 2" of in-situ soil will be removed.

5) Field screen and collect soil samples for laboratory analysis as required for baseline environmental assessment.
6) Grade sub-base as per engineering drawings water collection design for post-treated soil containment cell.
7) Compact the 40 feet by 40 feet sub-base using roller compaction.
8) Place 1” minus aggregate base in lifts no greater than 6 inches.
9) Conduct as-built survey of elevation of the 1” minus base layer.
10) Compact 1” minus base material by roller compaction.
11) Place 40 feet by 40 feet by quarter-inch steel plate sections.
12) Weld plate sections together. Inspection for coverage, penetration, and cracking
13) Weld steel plate to catch basin lid ring.
14) Weld 10” high by 3/16” plate curbs to three sides of of each containment cell as per engineered design. Weld 2” square tube by 1/8” thick curb on entrance side for loader access to cell.
15) Stack 2 feet by 2 feet by 4 feet pre-cast concrete blocks to achieve a 6 feet high containment wall. Blocks are stacked in a one over two and two over one pattern for stability.

4.5.2. Cover

The post-treated soil storage cells will have a non-permanent cover. The cell will be covered when not actively stockpiling treated soil with a minimum 6-mm reinforced polyethylene liner.

4.6. General Maintenance

General maintenance activities while the plant is in operation will include daily checks of the property perimeter to monitor volatile concentrations and the decibel level. STT personnel will traverse the property boundary with a photoionization detector (PID) for measuring volatile organic concentrations and a decibel meter to measure the noise from operations. Meter readings will be recorded in the daily operations log for each property corner as well as the location and reading of the highest measured levels. If volatile concentration readings are detected, STT will take corrective measures including covering the contaminated soil stockpiles inside the Quonset Hut™ with 6mm liner. The appropriate corrective action for excessive decibel levels will be determined upon discovery of the source of the noise.

The daily checks will also include monitoring for dust generation at the facility. STT will implement fugitive dust controls, including enforcing a 5 mile per hour maximum speed limit on the property for all vehicles and use of water dispersion. However, if due to adverse weather conditions (i.e. high winds), the facility controls are deemed not sufficiently effective to suppress dust generation, plant operations will shut down until site and weather conditions improve. Any unplanned shut downs due to emissions, noise or dust will be noted in the daily logs, along with the corrective actions taken and date and time of resumption.

STT personnel are responsible for continual monitoring and housekeeping around the contaminated soil secondary containment storage cell and under the feed system, crusher and processor. Daily maintenance activities will also include checking for and removing spilled soil from any areas that are not contained within asphalt. Any contaminated soil that falls on the ground around the storage cell or feed system will be cleaned up and placed back in the untreated soil cell or in the feed hopper for treatment. Any thermally treated soil that spills from the, covered, radial stacker prior to reaching a treated soil cell will be cleaned up and placed in the predestined treated soil cell.

4.7. Equipment Fuel Storage and Handling

Due the close proximity to a refueling station in Nikiski, there will be no bulk fuel storage on this facility. On occasion temporary small fuel containers (5-gallons or less) may be stored on-site. All small fuel containers will be stored within secondary containment large enough to hold the volume of any spills.

Duck ponds and absorbent material will also be used during equipment fueling. If a fuel spill occurs outside the containment cell, the impacted soil will be immediately cleaned up until no further fuel odor is detectable. The soil will be thermally treated.

Spills less than 10 gallons will be reported to the plant operator on shift at the time and recorded into the daily log. The time of spill, location, quantity and cleanup actions taken will be documented and reported to ADEC in a monthly report. Spills larger than 10 gallons will immediately be reported to the ADEC and assessed by a Third-Party Qualified Environmental Professional (QEP) in accordance with ADEC 18 AAC 75 regulations (ADEC, 2020a). Spill remediation will be conducted by a Third-Party contractor and excavated until confirmation soil samples are below ADEC cleanup levels.

4.8. Groundwater Monitoring

Baseline groundwater samples will be collected from the water supply well and a drinking water system well on the adjacent property to the east. Based on the ADEC Drinking Water Internal Map for the area, which indicates a southwesterly groundwater gradient in the area, the STT water supply well is situated down-gradient from the plant. Additionally, the well on the adjacent property to the east is in an upgradient position of the property. Initial and ongoing groundwater sampling of the wells will enable an assessment of the groundwater condition and any impacts, if any, from the operation of the facility. STT will conduct groundwater sampling annually to provide ongoing monitoring of the groundwater condition. The wells will be sampled for the full suite of contaminant analytes that the facility is approved to treat, including: DRO, RRO, GRO, Petroleum VOC, and PAH. The results of the sample analyses will be presented in an annual report to the ADEC for review and approval.

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5.0 SAMPLING, TESTING AND REPORTING

Once the petroleum-contaminated soil has been thermally treated in the SRU and stockpiled as described above, final confirmation samples for project COCs will be collected. Comingled stockpiles will be sampled for all COCs associated with each individual project, including: DRO, RRO, GRO, Petro VOC, and PAH. In addition, material accepted based on generator knowledge will also be analyzed for DRO, RRO, GRO, Petro VOC, and PAH. Post-treatment stockpile soils will be sampled to verify that the applicable cleanup levels have been met. Soil samples will be collected by a Third-Party QEP or a Qualified Environmental Sampler as defined in ADEC 18 AAC 75.333 (ADEC, 2020a) and in accordance with the collection and preservation requirements outlined in the *ADEC Field Sampling Guidance* (ADEC, 2019a) and the *UST Procedures Manual* (ADEC, 2017a) to ensure all chemistry data quality objectives are met, and that all data is defensible and usable for the project.

The minimum number of soil samples will be based on the volume of soil as shown in the table below. Grab soil samples will be collected in accordance with 18 AAC 78.605, Table C. Soil samples will be collected and analyzed in accordance with 18 AAC 78.271.

5.1. Post-Treatment Soil Screening, Sampling and Reporting

<u>Screening</u>

Post-treatment soil stockpiles will first be field screened using a photoionization detector (PID). Heated-head space PID readings will be collected for each 10 cy of treated soil for piles less than 100 cy, and on screening sample for each 20 cy of treated for piles greater than 100 cy. Soil for field screening samples will be collected from beneath the exposed surface of the soil at various depths throughout the pile, including near the base, with a minimum depth of 18 inches and placed into Quart-sized Ziploc® bags with double lock seals. Each bag will be partially filled with soil and immediately sealed to trap the volatile vapors. The headspace samples will then be warmed to at least 40 °F for a period of at least 10 minutes, but not longer than one hour, to permit headspace vapors to develop in the bag. The screening samples will be agitated for 15 seconds at the beginning and end of the headspace development to promote volatilization prior to screening with the PID. After sufficient time has passed for the development of vapors, the PID sampling probe will be inserted into the bag to measure the volatile organics. Field screening results for each stockpile will be recorded in a site logbook.

<u>Sampling</u>

After the soil has been screened, grab soil samples will be collected using disposable sampling spoons. Soil samples will be collected from the areas with the highest PID screening results. The number of samples per stockpile is based on volume and will be collected in accordance with 18 AAC 78.605, Table C as shown below.

One field duplicate sample will be completed for every 10 primary field samples collected for each target analyte. Soil samples for volatile analyses will be collected first, to minimize the loss of volatile compounds. For volatile samples, a minimum of 50 grams of soil will be placed directly into tared 4-ounce jars with a Teflon®-lined septum fused to the lid. Immediately following collection, 25 milliliters (mL) of methanol preservative will be added to the jar to completely submerge (and preserve) the volatile soil sample. A trip blank sample will also accompany all volatile samples to detect and identify any volatile contamination of the samples while travelling to and from the lab. Soil will then be collected for the remaining analyses and placed into laboratory-provided sample jars without preservative. After sample collection, each jar will be appropriately labeled, and immediately placed into a cooler with sufficient gel ice to maintain sample temperatures of 4 degrees Celsius (°C) ± 2 °C during transport to SGS North America Inc. in Anchorage, Alaska for analysis.

18 AAC 78.605(b) Table C Number of Samples for Post-Treatment Excavated Soil	
Cubic Yards of Soil	**Minimum Number of Samples**
0-10	1
11-50	2
51-100	3
101-500	5
501-1000	7
1001-2000	10
More than 2000	10, plus one additional sample for each additional 500 cubic yards, or additional samples as the department determined necessary to ensure protection of human health and safety, and the environment.

Source: 18 AAC 78.605(b) Table C (ADEC, 2020a)

Reporting

A record of the location, date/time of thermal processing, post-treatment sampling date/time and final analytical results will be maintained on-site at the STT facility. Upon receipt of the laboratory analytical report, the Third-Party QEP will submit the complete analytical laboratory report, the analytical data in a tabulated format with respective cleanup limits and the signed transport form or forms for comingled piles associated with the waste for ADEC approval. Any non-detected analytes will be presented in the data tables with the laboratory quantitation limits shown in parentheses, in accordance with the Technical Memorandum, Environmental Laboratory Data and Quality Assurance Requirements.

After laboratory results have been obtained and the treated soil does not meet applicable ADEC soil cleanup levels, the soil will be reprocessed through the SRU and the screening and sampling process will be repeated until the treated soil meets the cleanup levels.

6.0 ANNUAL REPORTING

STT will provide and annual report documenting inspections and maintenance of the pad and water treatment discharge results. The annual well sampling results will be included in the report. The report will document the results and findings of the annual groundwater sampling collected from the wells on the property. The annual reports will be submitted no later than the end of February of the following year.

7.0 SITE CLOSURE

Before initial startup (background) and after completion of the soil treatment facility operations (closure), an impartial qualified third party will assess the areas where treated and untreated soil is stored or handled. These areas are the contaminated soil storage and post-treatment stockpile area.

7.1. Background Assessment

The background assessment of the site soil will include:

1) A Incremental Sampling Methodology (ISM) approach will be used to evaluate the soil at the site. The site will be divided three decision units (DU) consisting of
    a. The contaminated soil staging area,
    b. The soil remediation unit area, and
    c. The treated soil area.
2) For each decision unit, a grid of at least 30 squares will be laid out using pin flags.
3) GPS coordinates from the corners of the DU will be collected so locations can be accurately relocated for closure sampling.
4) Individual sample increments of approximately 5 grams each will be collected from each grid square using a systematic random sampling approach and combined to form an ISM sample replicate, as follows:
    a. Determine the quadrant to be sampled using a random number generator: 1 = NW, 2 = NE, 3 = SW, 4 = SE. This will be the quadrant used for sampling all increments making up a single replicate.
    b. Place the sample increment in a 1-gallon Ziploc bag labeled with the sample ID, date/time of sampling, and requested analyses.
    c. Moving on to the next grid square, working in the same quadrant defined in step a., repeat step until all grid squares have been sampled.
5) Samples will be collected from freshly uncovered soil 6-12-inches below the ground surface.
6) Repeat step 4 for the remaining 2 ISM sample replicates comprising the ISM sample triplicate. Each replicate comprising the triplicate will have been collected from a single randomly selected quadrant.
7) Analyze samples for GRO, DRO, RRO, petroleum-VOCs, and PAHs.
8) All sample processing (i.e. sieving, homogenizing and subsampling) will be performed by the analytical laboratory.
9) Provide report to ADEC in compliance with *Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites* (ADEC, 2017b).

STT will also collect baseline groundwater samples from the onsite water well, and the adjacent property to the east, for analysis of GRO, DRO, RRO, petroleum-VOCs, and PAHs prior to commencing operations.

7.2. Facility Closure

Upon terminating operation of the treatment facility, STT will submit a closure assessment to ADEC within 90 days after termination. A closure sampling work plan for the property will be prepared for ADEC approval. Sampling procedures will be based on current regulations at the time of closure. If changes to regulations have occurred since the baseline assessment, sampling methodology will be updated to coincide with such changes. The closure assessment will demonstrate that secondary contamination did not occur at the facility. If secondary contamination did occur at the facility, STT will perform a cleanup of the contamination by in-situ or ex-situ treatment within two years after terminating operations.

After the treatment facility has been shut down and all the soil has been treated and removed from the site the following site activities will take place:

- The pre-treatment soil storage cell will be dismantled, and the asphalt pad material will be disposed of at an approved disposal facility. A QEP from a Third-Party sampler will prepare and submit a work plan to ADEC in accordance with current regulations detailing facility closure sampling procedures to determine if contamination is present in the subsurface. If contamination is not detected, the base material will be left in place.
- The treated soil stockpile steel plate pads will be dismantled and cleaned. A QEP from a Third-Party sampler will replicate the background assessment in the area to determine if contamination is present in the subsurface. If contamination is not detected, the base material will be left in place.
- Samples will be analyzed for GRO, DRO, RRO, petroleum-VOCs, and PAHS.

<u>Contaminated soil</u> detected in or under the contaminated soil storage cell or post-treated stockpile cells will be remediated and run through the processor, sampled and analyzed as if it were soil from any other project. This will be done in accordance with this Operations Plan.

Upon completion that the treated soil meets ADEC soil cleanup levels and upon receipt of ADEC approval for final disposal, the treated soil will be used as backfill material at an approved location.

7.3. Final Report

When all areas of the treatment facility have been remediated, assessed and sampled, the Third-Party QEP will provide a final report documenting field screening activities and analytical laboratory data to the ADEC. The final report will be submitted within 90 days of facility closure and prepared in accordance with the most current guidance at the time of site closure. If desired, ADEC can conduct a final inspection of the site after STT has dismantled all of the equipment.

8.0 REFERENCES

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FIGURES

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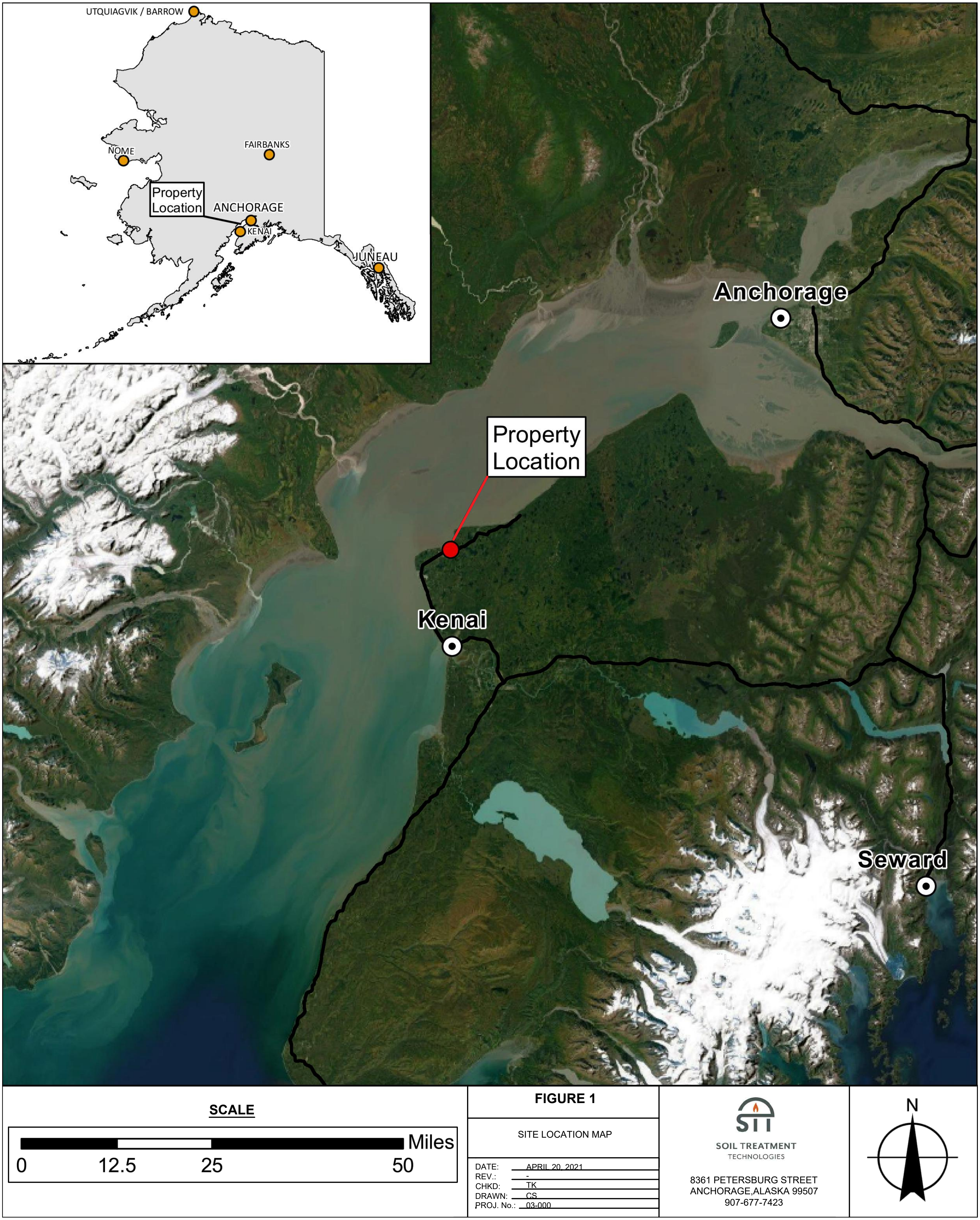


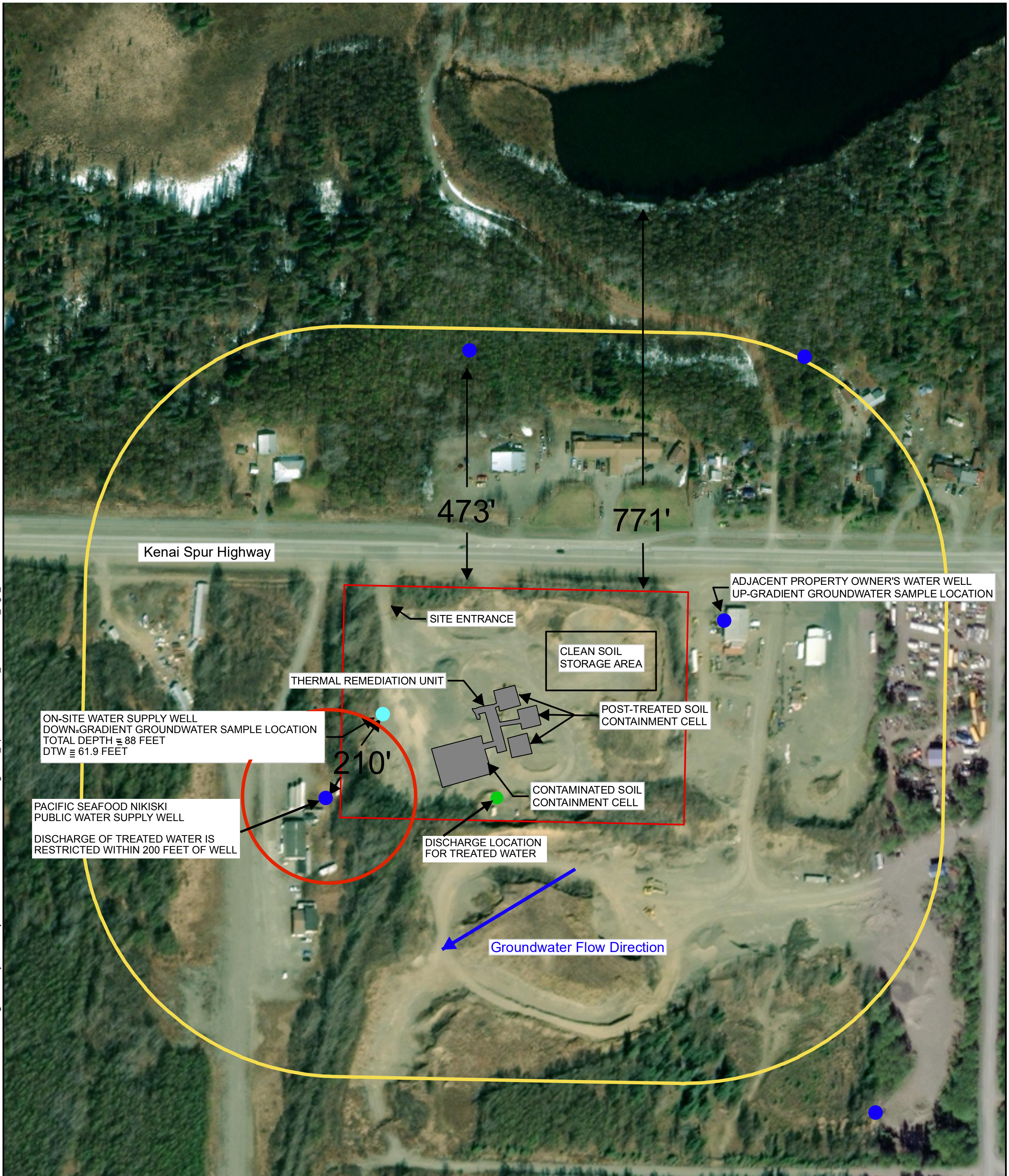
FIGURE 1

SITE LOCATION MAP

DATE: APRIL 20, 2021
REV.: -
CHKD: TK
DRAWN: CS
PROJ. No.: 03-000

SOIL TREATMENT TECHNOLOGIES

8361 PETERSBURG STREET
ANCHORAGE,ALASKA 99507
907-677-7423



Document Path: \\MacAllFiles\Volumes\GoogleDrive\My Drive\Projects\03-000 Soil Treatment Technologies\01_Operations Plan\04_GIS\mxd\STT_Fig2_080321.mxd

Facility Property Boundary

500 Feet Perimeter Boundary

Private Water Supply Well
* Well Locations Based on WELTS Database

On-Site Water Supply Well

Feet
0 250

FIGURE 2
Site Map

DATE: August 4, 2021
REV: 2
CHKD:
DRAWN: NJB
PROJ NO.: 03-000

SOIL TREATMENT
TECHNOLOGIES

8361 PETERSBURG STREET
ANCHORAGE, ALASKA 99507
907-677-7423

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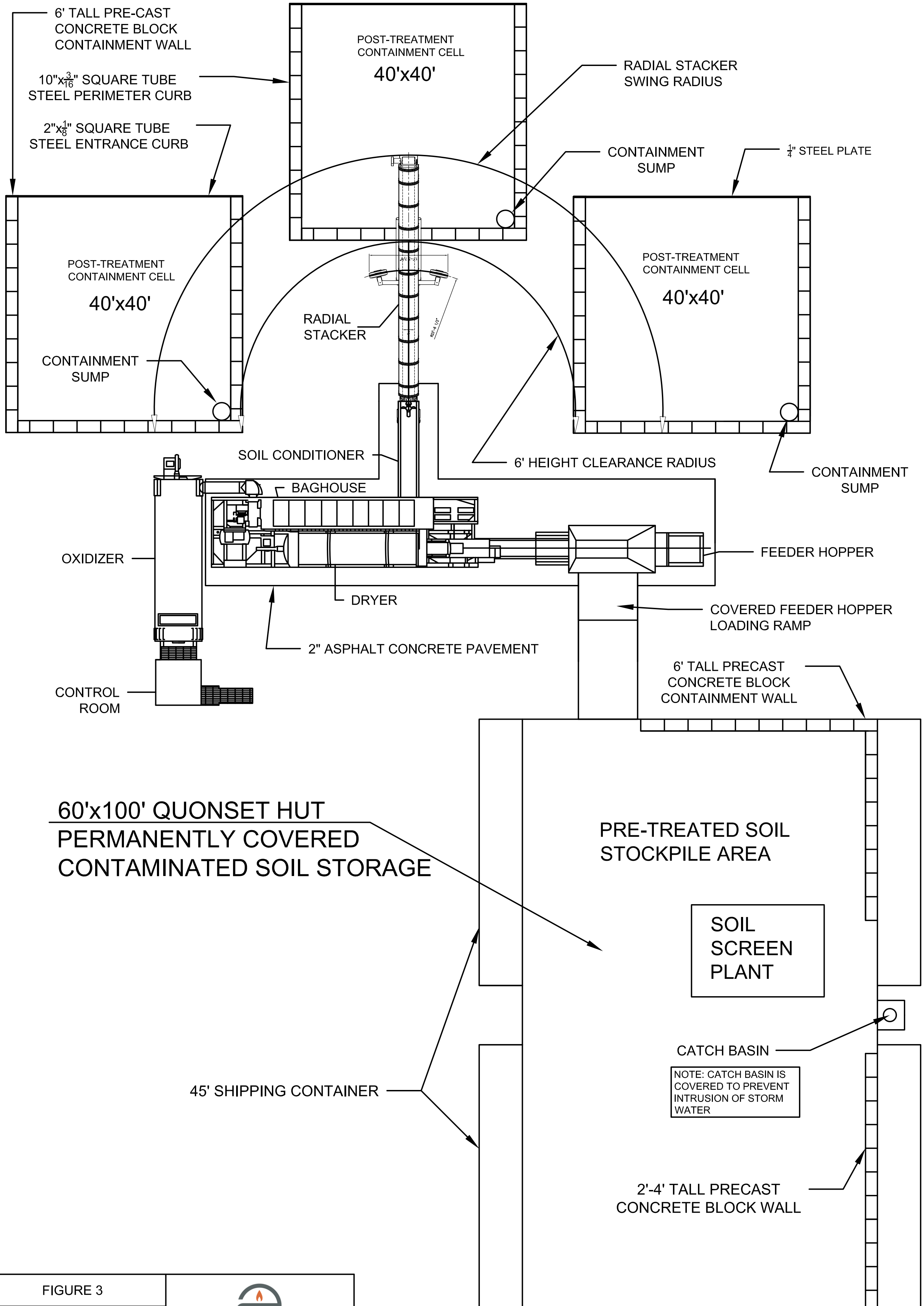

PLAN VIEW

FIGURE 3

SOIL REMEDIATION UNIT OPERATIONAL LAYOUT

DATE: JUNE 4, 2021
REV.: 1
CHKD: TK
DRAWN: CS
PROJ. No.: 03-000
Scale 1"=16'

SOIL TREATMENT TECHNOLOGIES
8361 PETERSBURG STREET
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ATTACHMENT 1

ENGINEERING PLAN

THERMAL TREATMENT PLANT

ENGINEERING PLAN

NIKISKI, ALASKA

August 10, 2021

Prepared for:

Alaska Department of Environmental Conservation

Prepared by:

SOIL TREATMENT
TECHNOLOGIES

8361 Petersburg Street
Anchorage, Alaska 99507

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ENGINEERING DESIGN

THERMAL TREATMENT

NIKISKI, ALASKA

August 10, 2021

Prepared by:

__________________________ August 10, 2021

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Engineer, PE
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Project Manager
Soil Treatment Technologies, LLC

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11. Post-Treated Soil Containment Cell Construction

APPENDICES

A. Enviroseal LAS-320™ Technical Data Sheet and Information
B. Pre-Treated Soil Containment Cell Hard Surface Load Design and Results
C. Catch Basin Supplier Specifications

D.

ACRONYMS AND ABBREVIATIONS

°C ....degrees Celsius
°F....................degrees Fahrenheit
AAC ....Alaska Administrative Code
ADEC ....Alaska Department of Environmental Conservation
BTEX..............benzene, toluene, ethylbenzene and xylenes
cy....................cubic yards
DOT................Department of Transportation
DRO ....diesel-range organics
GAC................granular activated carbon
GRO ....gasoline-range organics
mL ....milliliter
mm ....millimeter
PPE ....personal protective equipment
PVOCs ....petroleum-volatile organic compounds
QEP................Qualified Environmental Professional
QES................Qualified Environmental Sampler
RRO ....residual-range organics
SRU................soil thermal remediation unit
STT.................Soil Treatment Technologies, LLC
VOCs..............olatile organic compound

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1. INTRODUCTION

This Operations Plan is prepared by Soil Treatment Technologies, LLC. (STT) for the thermal remediation of petroleum-contaminated soil on the Kenai Peninsula. The thermal soil treatment facility will be set up in Nikiski, Alaska. STT is requesting Alaska Department of Environmental Conservation (ADEC) approval of this Operations Plan to operate a soil thermal remediation unit (SRU) as a Category D Offsite Treatment Facility receiving petroleum-contaminated soil from multiple projects/facilities for more than three years of operation.

This plan has been prepared in accordance with ADEC Title 18 Alaska Administrative Code (AAC) 75.365 (18 AAC 75.365), 18 AAC 78.273 and the *Operation Requirements for Soil Treatment Facilities* (ADEC, 2013).

In accordance with 18 AAC 75.365 and 18 AAC 78.273, an owner/operator of an offsite or portable treatment facility must prepare an Operations Plan for ADEC approval prior to accepting or treating contaminated soil. As part of the Operations Plan, an Engineering Plan is required to demonstrate the adequacy of the facility to meet ADEC requirements. This Engineering Plan and Design addresses the following as required:

1. Facility Location, Operation and Overview
2. Design for petroleum resistant surface and loading design parameters
3. Soil base selection, placement, and preparation
4. Nondomestic water control, collection and processing plan
5. Inspection and Maintenance plan

The following sections in this Engineering Plan describe in detail the items listed above.

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2. FACILITY OPERATION OVERVIEW

2.1 Facility Location

The proposed facility will be located at 52520 Kenai Spur Highway, Nikiski, Alaska 99611. The property is bordered by the Kenai Spur Highway to the north, vacant lot to the south, and commercial properties to the east and west. The largest nearby water body is a lake located 771 feet north from the site. Cook Inlet is located approximately 1 mile to the northwest. There are two water supply wells within 500-feet of the facility perimeter. The wells are approximately 94 feet and 473 feet from the proposed site property perimeter. The proposed site location and nearby water sources are shown in Figures 1 and 2.

2.2 Unit Overview and Construction

Soil Treatment Technologies, LLC. (STT), the sole owner and operator of the thermal remediation unit will plan to start construction of the facility in May 2021. The facility will be built at 52520 Kenai Spur Highway, Nikiski, Alaska on a 7.14-acre lot. The thermal remediation unit will occupy a footprint of approximately 1,267 square feet. Dimensions and drawings of the unit are shown in Figures 3 and 4. Construction of the facility is estimated to be completed by June 2021. STT will assume operation and maintenance of the facility in accordance with operation and maintenance plans.

2.3 Construction Timeframe and Summary of Events

- June-July 2021
    - Surveying (Original grade and site boundaries)
    - Dirt work for pre-treated soil containment cell (excavation, soil assessment, grading, base material preparation)
    - Collect environmental baseline samples
    - Dirt work (Final base preparation, surveying, catch basin install)
    - Asphalt Concrete pad placed and finished
    - Survey pad
    - Start Quonset hut construction
        - Place shipping containers along perimeter of pad
        - Place and secure Quonset hut base frame
        - Start assembling framing
    - Quonset hut construction
        - Assemble framing and walls

    - Apply Enviroseal LAS-320™ Sealer to pre-treated soil containment cell asphalt concrete slab
    - Stage Dirt Burner
    - Construct post-treatment containment cells
        - Dirt work (excavation, grading, base preparation)
        - Surveying
- August-September 2021
    - Post-treatment containment cell construction
        - Welding steel plate seams
        - Survey grade for positive drainage
        - Weld steel curbs to pads
        - Place precast concrete blocks for containment walls
    - Operational assembly of remediation unit
        - Utilities hooked up (natural gas and electricity)
        - Assembly checklist
        - Verify operation of unit (Start-up and shutdown)
        - Verify operation of safety devices
    - Construction is completed and remediation unit is operational

2.4 Operation Layout

The unit will be staged centrally on the site. The pre-treated soil stockpile will be under roof from the time the soil is received at the facility and until soil is delivered to the remediation unit's feeder hopper for treatment. The post-treated soil containment cell will not have a permanent roof structure. Pre-cast concrete blocks will be stacked on the perimeter of the three post-treated soil containment cells to facilitate the stockpiling of soil from multiple jobs and create additional containment for the soil. The operation layout plan (Figure 5) shows the staging location for the pre- and post-treated soil stockpiles, remediation unit, and structure.

2.5 Operation

When possible, soil will be screened at client's site to remove oversized material greater than 2-inch in diameter before it arrives at STT for treatment. If oversized material is present in significant quantities upon delivery, contaminated soil will be loaded into a screen plant, located within the Quonset hut, to screen out material greater than 2-inch in diameter before entering the thermal processing stream (ADEC, 2005). Oversized material, greater than 2-inches in diameter, that is screened from contaminated soil will remain on asphalt containment area within the Quonset hut. Oversized material will be thoroughly washed using a pressure washer to remove any residual soil material. Residual sediment from oversized material will be included with contaminated media for thermal treatment. Rinse water will be captured in containment sump and will be treated as described below. Washed oversized material will be stored onsite with treated soils and will be used for beneficial reuse.

Once the material has been screened, it will be stockpiled on an asphalt pad in a covered, enclosed, containment area awaiting treatment. A front-end loader will transfer the contaminated soil from the stockpile via a paved ramp to the 10-cubic yard (cy) feed hopper. The feed hopper discharges the material onto a feeder conveyor belt with a weigh bridge to the dryer. Once the material has had adequate retention time in the dryer, it is transferred to the baghouse. Any finer materials that are collected from the filters in the baghouse will be homogenized with this material and transferred to the soil conditioner by a 12-inch auger located under the filter housing. From the baghouse unit, the soil drops into the soil conditioner where water is introduced, cooling the material from approximately 600 degrees (^{o}) Fahrenheit (F) to approximately 250 ^{o}F. The material then moves onto a radial stacker that piles the remediated material into stockpiles onto a steel plate pad where it will remain until post-treatment samples have confirmed the material has been fully remediated.

2.6 Structure

The Quonset hut will cover the 6,000 square feet pre-treated soil containment cell to mitigate the collection of unnecessary nondomestic water. The structure will be fastened to the top of shipping storage containers to gain additional clearance and allow for safe operation of the loader without overhead clearance concerns. Nondomestic water collection is anticipated to be minimal. However, drainage contours leading to a catch basin are designed into the pre-treated soil containment cell to collect water from saturated loads of soil and nondomestic water that may intrude into the facility from various sources. Nondomestic water collection is discussed further in Section 5. The structure for the facility is shown in Figure 6.

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3. LOAD PARAMETERS AND HARD-SURFACE DESIGN

This section will discuss the design for a petroleum resistance hard-surface soil containment cell and designed loading parameters.

3.1 Petroleum Resistance Hard-Surface Containment Structures

3.1.1 Pre-Treatment Surface

An enclosed 60 feet by 100 feet by 2-inch thick asphalt concrete pad has been designed to be the pre-treated soil containment cell. A coating of Enviroseal LAS-320™ will be applied after asphalt concrete has been placed and finished. The LAS-320™ is an asphalt sealer classified by the FAA as a Fuel Resistant Sealer (n.d. *ENVIROSEAL LAS-320 Technical Product Information*) and meets the specifications of a petroleum resistance hard surface. Specifications for LAS-320™ are attached in Appendix A. Sealing the asphalt concrete with LAS-320™ will create an impermeable layer preventing liquids from migrating to the subbase and protect the integrity of the asphalt through freeze-thaw conditions. Inspection and maintenance of the asphalt concrete surface are discussed in Section 6.

3.1.2 Post-Treatment Surface

The post-treatment pads will consist of three 40 feet by 40 feet by ¼ inch steel plate surfaces to resist deterioration and fatigue from the temperature of the post-treated dirt. The designed configuration will allow for three stockpiles. Each plate is welded together to create a seamless and impermeable surface. The plates will be set at a 0.25% grade to allow for nondomestic water control and collection. Drainage design and collection are discussed further in Section 5.

3.2 Load Parameters

3.2.1 Pre-Treatment Load Parameters

The asphalt concrete pad was designed in accordance with the Alaska DOT Alaska Flexible Pavement Design Manual (AKDOT, 2020) for low-speed traffic. Low speed traffic consists of Category 8 trucks and trailers offloading soil as well as a Volvo MCT135C skid steer and New Holland L130B loader working on the slab to screen and process the soil. The plant is expected to be seasonally operated in spring, summer and fall, with potential to operate in the winter.

The load design was developed using input through the Alaska Flexible Pavement Design Software and evaluated through Excess Fines and Mechanistic methods. Base design data and results are shown in Appendix B. Design results conclude 2” of asphalt followed by 16” of aggregate base will meet designed traffic load requirements without damage to asphalt surface, aggregate base, and subgrade materials.

3.2.2 Post-Treatment Load Parameters

The post-treated soil will be stockpiled on quarter-inch steel plate measuring 40x40 feet. The designed capacity of the containment cell will be 400 tons of remediated soil per cell. Design consideration will be the bearing capacity of the soil to support the design weight of the soil and steel plate which is calculated to be 173 pounds per square foot. The soil bearing capacity of compacted aggregate base is 3,000 pounds per square foot. The soil bearing capacity and design will be adequate to support the designed load with a compacted aggregate base material such as crushed aggregate D-1 base as specified by base material selection in Section 4.

4. BASE SOIL CONSTRUCTION

Soil in this area is categorized by USDA Soil Survey Map as Soldotna silt loam. Soldotna silt loam profile is described as follows: 0-4 inches of moderately decomposed plant material, 4 to 7 inches of silt loam, 7 to 22 inches of silt loam and 29 to 60 inches of very gravelly sand. Drainage class for this area is well drained. (USDA,2019)

4.1 Base soil selection, placement, preparation

The site was previously used as a gravel quarry indicating potential for adequate soil bearing capacity to currently exist. Due to previous operations at the site, the area has been compacted from previous driving and loading operations from heavy equipment and trucking. The site soils have been excavated into the very gravelly sand layer with banks of overburden material delineating the property boundaries.

4.1.1 Selection and Placement

An assessment will be made to determine the bearing capacity and frost susceptibility of the soil to a depth of 18 inches. A minimum of 2 inches of existing soil will be excavated from the asphalt concrete slab and steel plate footprints. Additional subgrade material may be removed at the discretion of the on-site engineer if frost susceptibility, vegetation and organics or inadequate soil mechanics are encountered during the assessment. Backfill material selection will consist of crushed aggregate D-1 base to be placed and finished in lifts no greater than 6 inches. Finishing of base material will occur through roller compaction to achieve 95% maximum density through the backfill process. Base and surface layer construction for post and pre-treatment pads are shown in Figure 7.

4.1.2 Preparation

Preparation of the site will consist of an engineer or land surveyor to survey original grade of the site and planned containment cell locations. After the site soil assessment is made, soil is excavated to a minimum depth of 2 inches or as determined by on-site engineer. Subbase material will be excavated and graded accordingly with drainage requirements set by engineered drawings (Figure 8). Excavation and contour grade will be surveyed prior to backfilling with D-1 base material. Grade is surveyed after placing and finishing D-1 base material to ensure drainage requirements specified by engineered drawings are met. The base construction is complete once drainage and contour requirements specified by engineering plans are met.

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5. NONDOMESTIC WATER CONTROL, CONTAINMENT AND PROCESSING

This section will discuss the water control, collection and processing plan for the pre and post-treated soil containment cells.

5.1 Pre-Treated Soil Containment Cell

The pre-treated soil containment cell is completely covered to mitigate water from rain and snow melt from collecting on the slab. However, a contingency has been built into the containment cell to control water from saturated soil loads and intrusion from rain and snow melt.

5.1.1 Water Control and Containment

The containment cell is contoured to allow nondomestic water to be collected at a single catch basin. The swale design as part of the engineering plans consists of 4.2 inches of fall as shown in Figure 8 and 9. The containment cell is a 4'x4'x4' cast reinforced concrete catch basin. Specifications for the catch basin are shown in Appendix C. The catch basin will be set in place prior to placing asphalt concrete. The top of the catch basin will be set at the same grade as base material so asphalt can be placed atop the basin and finished flush with lid. Joints between the asphalt and basin will be sealed with joint sealant. An asphalt curb will be constructed around the catch basin that extends to original grade to prevent exterior water runoff from collecting in the system. Straw wattles will be placed inside the swale before the catch basin to minimize sediment in the catch basin. The catch basin will be on the exterior of the enclosure therefore a steel plate or water-resistant fabric roof will be constructed to keep the sump covered and prevent collection of unnecessary nondomestic water. The exterior grade around the building perimeter will be sloped at 5% to a minimum of 10 feet to shed water away from the catch basin and containment cell.

Any water draining from imported material will be drained to the catch basin. In addition, the catch basin will also collect runoff wash water from the washing of oversized material. Any oversized material that is screened out of soil stockpiles will be washed using a pressure washer to remove any residual contaminated soil. The material will be washed inside the Quonset hut so that the runoff will also be collected into the catch basin.

5.1.1 Water Handling and Processing

Nondomestic water collected in the catch basin will be treated as hazardous material. The water will be pumped out using a sump that leads to a granular activated carbon (GAC) filter and then stored in a 250-gallon ISO-tank container. A post-filtered water sample will be collected and submitted to a laboratory for analysis once a year at the beginning of each operating season after sufficient water accumulation. The water sample will be tested for the following analytes to calculate total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH):

- Benzene, toluene, ethylbenzene and total xylenes by SW 8260C
- Polyaromatic hydrocarbons (PAH) by 8270D-SIM

Filtered water with lab results below ADEC cleanup levels will be discharged onto the ground surface at least 100 feet away from any known drinking water wells or surface water bodies following ADEC approval. Subsequent water collection and processing will consist of GAC filtering. Filtered water will be inspected to ensure no sheen or odor is present prior to surface discharge.

Minor quantities of water will be pumped back into the pre-treated soil stockpile to be evaporated during thermal treatment. Accumulated sediments from the drainage sump will be removed as needed using a vacuum unit. Sediments will be deposited back onto the pre-treated soil stockpile, and remediated by thermal treatment.

5.2 Post-Treated Soil Containment Cell

The post-treated soil containment cell will not have a permanent roof structure. The cells will be covered when not actively stockpiling remediated soil to mitigate rainwater from collecting in the cell. While actively remediating soil, the selected cell will be open to allow for the deposition of thermally remediated soil from the radial stacker. Radial stacker will be adjusted to ensure soil remains within the containment area. A loader will also be used to adjust the pile if needed. Water collected from rain will follow the drainage design for post-treated containment cell.

5.2.1 Water Control and Containment

The containment cells are composed of three 40'x40'x0.25" steel plates and will be constructed as shown in Figures 10 and 11. A curb constructed of 10" high, welded plate steel, will be welded around the perimeter of three sides of the catch basin. Additionally, a 2" welded square tube curb will be welded along the access side of the cell. The containment cells will be set at 1.0% grade to allow nondomestic water to be collected at the low end of each cell. The drainage design is shown in Figure 10 and consists of 4.8 inches of fall from grade to the lower end of the cell. A 36-inch diameter HDPE perforated culvert will be located in one corner of the cell with a sump pump capable of pumping at 10 gallons per minute for water removal.

The water containment is designed for the containment of a 25-year storm event, with a 1 hour duration, and an intensity of 0.65 inches of precipitation per hour. This precipitation will generate 552 gallons of water per hour. The water capacity of the cell is designed to contain 2025 gallons of water if no soil is in the cell, and 607 gallons of water if the cell is completely full of soil. Contained water will be pumped to holding tanks and treated with GAC as described in Section 5.2.2 below.

All soil cells will remain covered when not actively filling the cell. If storm duration is greater than design intensity, or if storm duration is longer than 1 hour, the following steps will be taken to ensure containment breach does not occur.

1. The uncovered cell will be covered until the storm subsides.
2. Water will be pumped to holding tanks for additional containment volume.

5.2.2 Water Handling and Processing

Nondomestic water collected in the catch basin will be pumped into a 250-gallon ISO-tank containers, as needed. A water sample will be collected and submitted to a laboratory for analysis once a year at the beginning of each operating season once sufficient water has accumulated. The water sample will be tested for the following analytes to calculate total aromatic hydrocarbons TAH and TAqH:

- Benzene, toluene, ethylbenzene and total xylenes by SW 8260C
- Polyaromatic hydrocarbons (PAH) by 8270D-SIM

Filtered water with lab results below ADEC cleanup levels will be discharged onto the ground surface at least 100 feet away from any known drinking water wells or surface water bodies following ADEC approval. Subsequent water collection and processing will consist of GAC filtering. The method of treatment of water using a GAC filter is describe as follows:

1. Dewatering water shall be pumped through a 55-gallon drum of granular activated carbon (GAC).
2. The clean effluent water from the GAC drum shall be discharged to the ground surface at least 100 feet away from any known drinking water wells or surface water bodies.
3. For fuel hydrocarbons, contamination breakthrough in the GAC effluent (the point when measurable contaminants are first detected in the effluent) typically occurs when the weight of the contaminants in the influent is equal to approximately 10 percent of the weight of the activated carbon (for example, 3 pounds of hydrocarbons for 30 pounds of activated carbon). Assuming the influent concentration is less than the solubility of diesel fuel (about 5 milligrams per liter [mg/L]), the quantity of water that can be filtered with a 55 gallon GAC canister with 200 pounds of activated carbon is approximately 480,000 gallons.

Calculation: 5 mg/L DRO x 2.205 x 10-6 pounds/mg x 3.785 L/gallon

= 4.173 x 10-5 pounds of DRO/gallon;

200 pounds of GAC x 10% = 20 pounds capacity before breakthrough.

20 pound capacity /(4.173 x 10-5 pounds DRO/gallon of water)

= 479,271 gallons of water.

4. The field staff shall collect samples of water discharged from the GAC filtration system in a bucket or other container throughout treatment for visual observation. To ensure that the GAC filtration system is operating properly, observations should be made and recorded with respect to appearance, odor, and presence or absence of sheen.

   No sheen or free product should be filtered through the GAC canister because this would rapidly exhaust the treatment capacity. If sheen or free product is observed prior to treatment, sorbent pads shall be used to remove the product so that only water with dissolved-phase hydrocarbons is passed through the filter.
5. Quantity of water treated through GAC container will be recorded on maintenance logs to ensure capacity of GAC is not exceeded.

Minor quantities of water will be pumped back into the treated soil stockpile to be evaporated.

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6. INSPECTION AND MAINTENANCE PLAN

6.1 Pre-Treated Soil Containment Cell

6.1.1 Daily Inspection

A checklist will be generated that outlines inspection items that must be completed daily and weekly during operation. Items that will be inspected but not limited to the following items:

- Asphalt condition (cracking, gouging, damage, etc.)
- Asphalt top coat sealer condition
- Sediment control device condition (wattles)
- Sediment accumulation in swales
- Catch basin water accumulation
    - Applicable for heavy rainfall overnight or processing of saturated loads the previous day
- Catch basin and asphalt joint sealant condition
- Catch basin curb condition

6.1.2 Maintenance

- Asphalt Repair Large (Gouges, Holes, Etc.)
    - Repairs to the asphalt will be made with asphalt cold patch.
    - The repair area will be cleaned to remove fines and dirt. Loose asphalt material will be removed.
    - Heat is applied to damaged area to promote adhesion of cold patch asphalt to existing slab.
    - Cold patch is set in repair spot and compacted. Leave asphalt patch slightly heaped.
    - Apply LAS-320™ according to manufacture specifications and allow 24 hours of drying time before loading affected area.

- Asphalt Repair Small (Cracks ½" or less)
    - Fill crack with sand.
    - Pour LAS-320™ into crack and thoroughly coat the sand.
    - Broom out excess material.
    - Allow material to dry.

- Asphalt Sealer Repair
    - The asphalt sealer must be maintained to ensure the hard surface remains impermeable and fuel resistant compliant.
        - The top coat and surrounding area should be inspected for gouging, holes and cracks.
            - Necessary repairs should be made prior to recoating.

- Re-apply LAS-320™ sealer to worn area according to manufacture specifications.
- Allow 24 hours of drying time before loading affected area.

- Asphalt Recoating
  - Recoating of Enviroseal LAS-320™ sealer shall occur every 5 years.
  - Recoating shall be in accordance with manufacture specifications.

- Sediment Control Devices
  - Wattles that have been compacted or damaged shall be replaced.
  - Wattles that are saturated with fines shall be replaced.

6.2 Post-Treated Soil Containment Cell

6.2.1 Daily Inspection

A checklist will be generated that outlines inspection items that must be completed daily and weekly during operation. Items that will be inspected but not limited to the following items:

- Steel plate surface condition (cracking, gouging, damage, etc..)
- Steel plate seam inspection (cracks)
- Sediment control device condition (wattles)
- Sediment accumulation at bottom of containment wall
- Catch basin water accumulation
  - Applicable for heavy rainfall overnight or processing of saturated loads the previous day
- Steel plate weld condition
- Containment cell curb condition
- Sediment accumulation along catch basin curb

6.1.2 Maintenance

- Steel Plate Repair Large (Gouges, Holes, Etc.)
  - Repairs to the steel plate will be replaced with same material (1/4" steel).
  - The damaged area will be cut out.
  - The new plate will be set in place and welded.
  - Inspect weld seam for gaps and penetration.

- Steel Plate Repair Small (Cracks, Etc..)
  - Cracks will be cleaned by abrasive wheel.
  - Remove weld material if crack is at a seam.
  - Drill stress relief hole if necessary.
  - Weld crack.
  - Inspect weld for gaps and penetration.

- Curb maintenance and repair
    - Damaged curbs will be repaired with same material.
    - Damaged welds will be ground out and surrounding material will be cleaned by wire brush or abrasive wheel before being welded.
    - Water-tight integrity of the curb will be monitored.

- Sediment Control Devices
    - Wattles that have been compacted or damaged shall be replaced.
    - Wattles that are saturated with fines shall be replaced.

6.3 Reporting

STT will provide and annual report documenting inspections and maintenance of the pad and water treatment discharge results. The annual report for operations will be submitted no later than the end of February of the following year.

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7.0 REFERENCES

ADEC, 2005. ADEC, *Division of Spill Prevention and Response, Contaminated Sites Programs, Technical Memorandum: Petroleum Hydrocarbon Cleanup for Oversize Material*. September 1, 2005.

n.d. *ENVIROSEAL LAS-320 Technical Product Information*. [PDF] Enviroseal Corporation, pp.1-2. Available at: <http://www.enviroseal.com/>.

AKDOT, 2020. Alaska Department of Transportation and Public Facilities, Alaska Flexible Pavement Design Manual, http://www.dot.state.ak.us/stwddes/desmater ials/assets/pdf/pvmtdesign/flexpvmt_mnl.pdf, July 1, 2020

USDA, 2019. *Web Soil Survey - Home*. [online] Available at: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

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FIGURES

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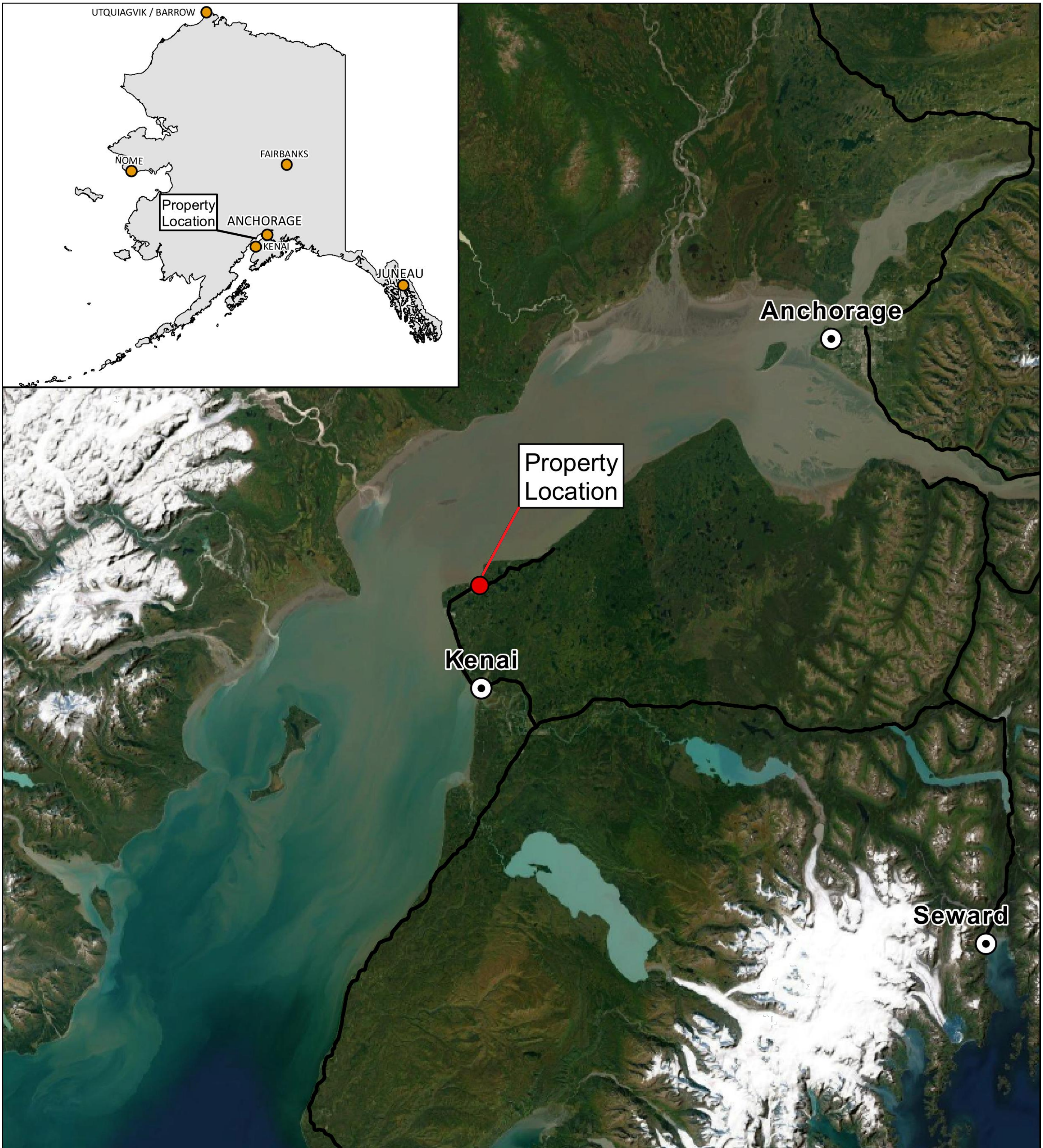

SCALE

Miles
0 12.5 25 50

FIGURE 1

SITE LOCATION MAP

DATE: APRIL 20, 2021
REV.: -
CHKD: TK
DRAWN: CS
PROJ. No.: 03-000

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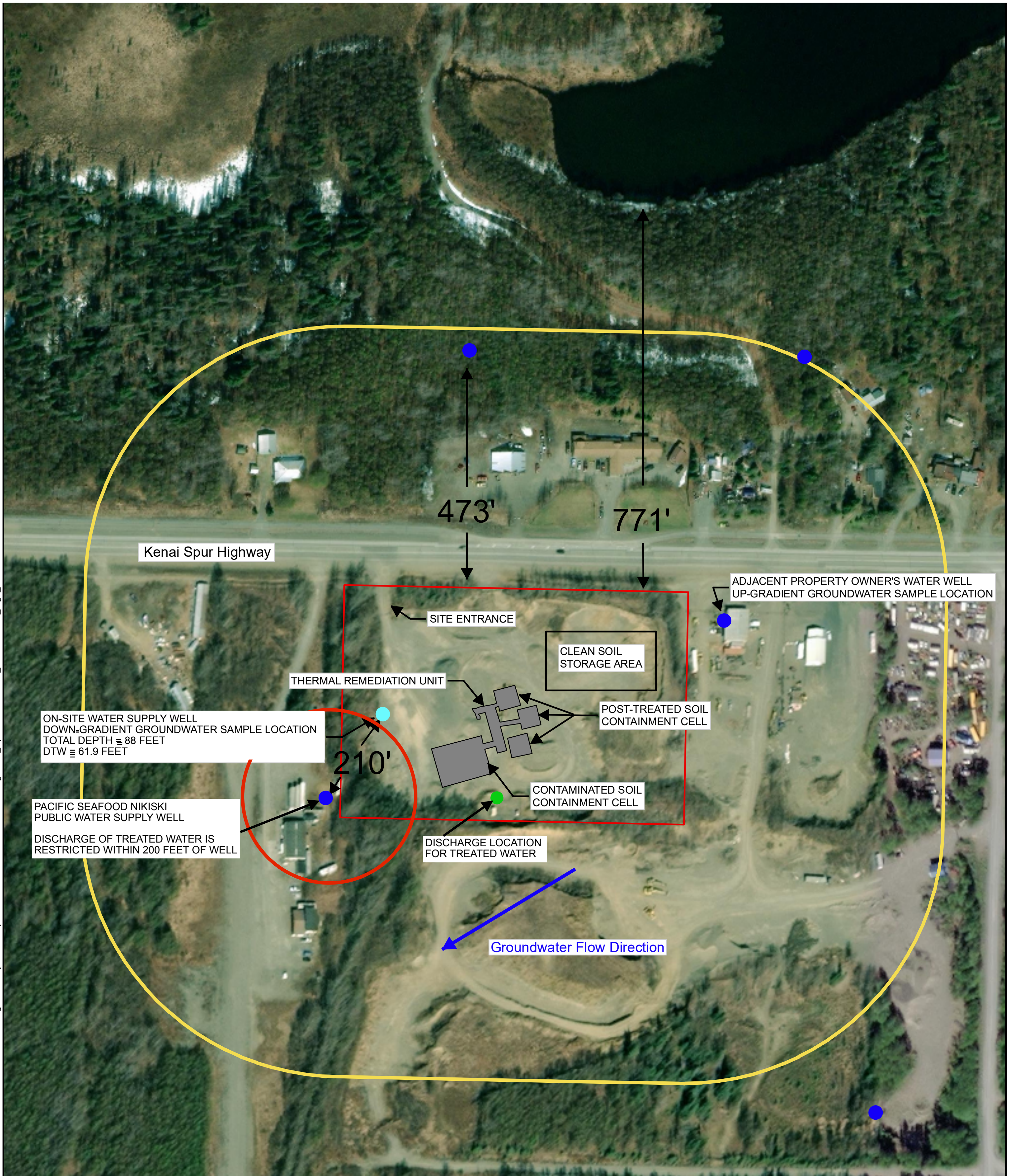

Facility Property Boundary

500 Feet Perimeter Boundary

Private Water Supply Well

* Well Locations Based on WELTS Database

On-Site Water Supply Well

Feet

0 250

FIGURE 2
Site Map

DATE: August 4, 2021
REV: 2
CHKD:
DRAWN: NJB
PROJ NO.: 03-000

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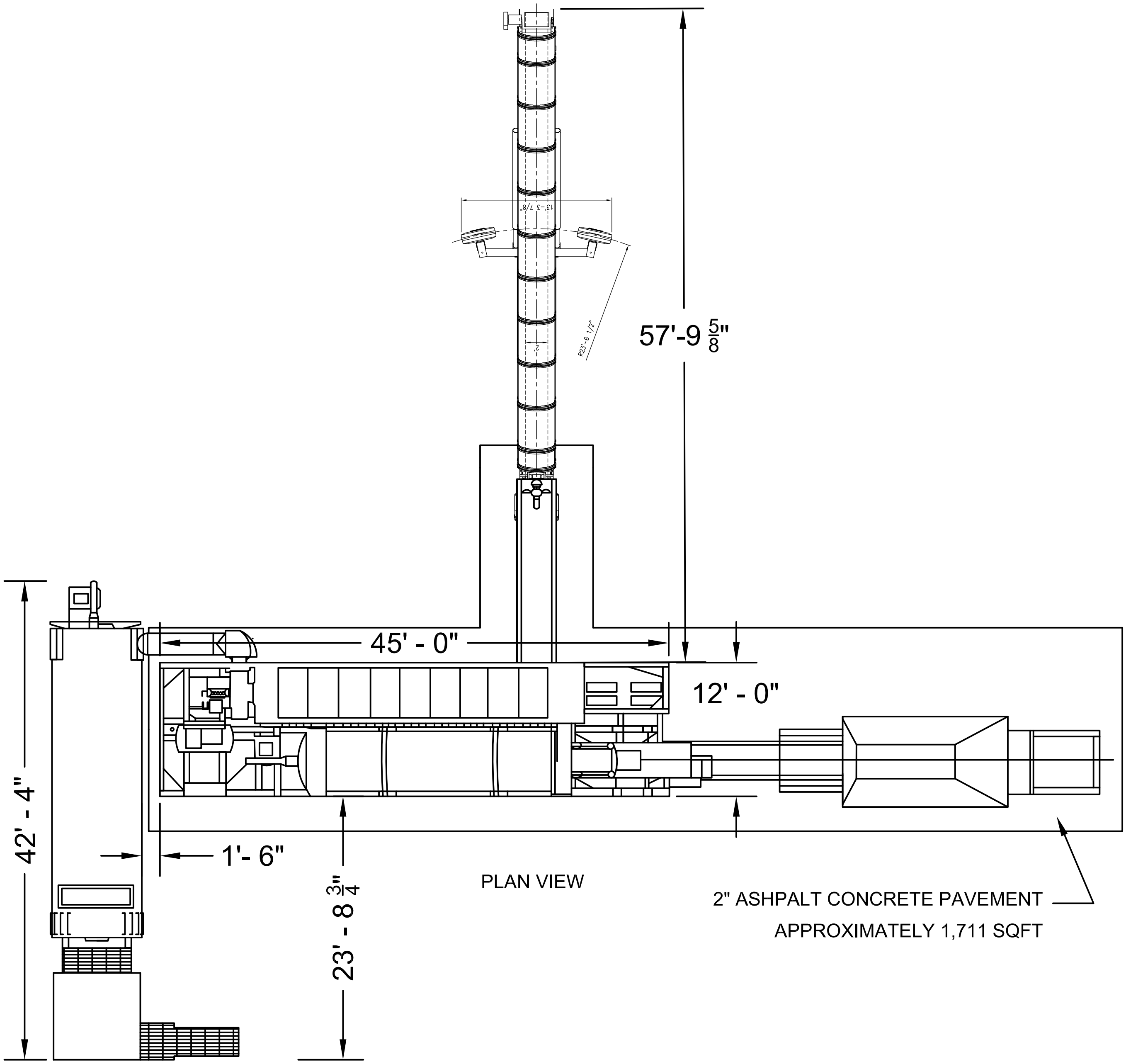

FIGURE 3

OPERATIONAL FINAL ASSEMBLY FOR REMEDIATION UNIT-PLAN VIEW

DATE: JUNE 4, 2021
REV.: 1
CHKD: TK
DRAWN: CS
PROJ. No.: 03-000
Scale 1"=10'

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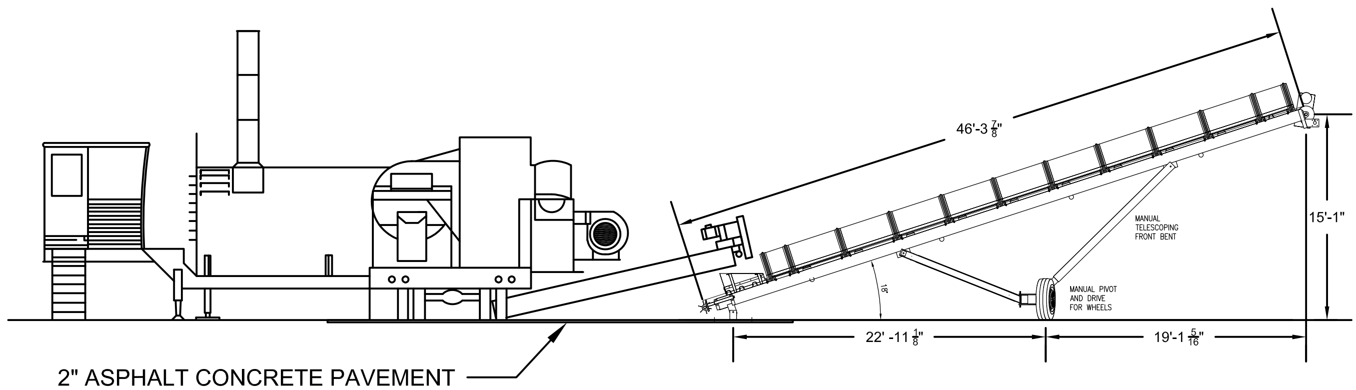
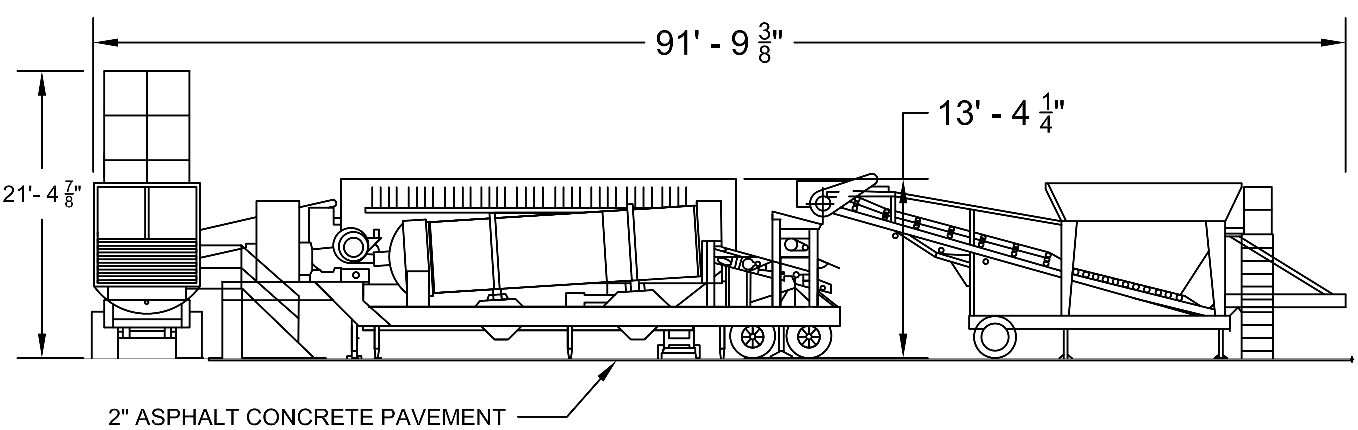


REAR VIEW



SIDE VIEW

FIGURE 4

OPERATIONAL FINAL ASSEMBLY FOR SOIL REMEDIATION UNIT - SIDE VIEW

DATE:	APRIL 20, 2021
REV.:	1
CHKD:	TK
DRAWN:	CS
PROJ. No.:	03-000

Scale 1"=10'

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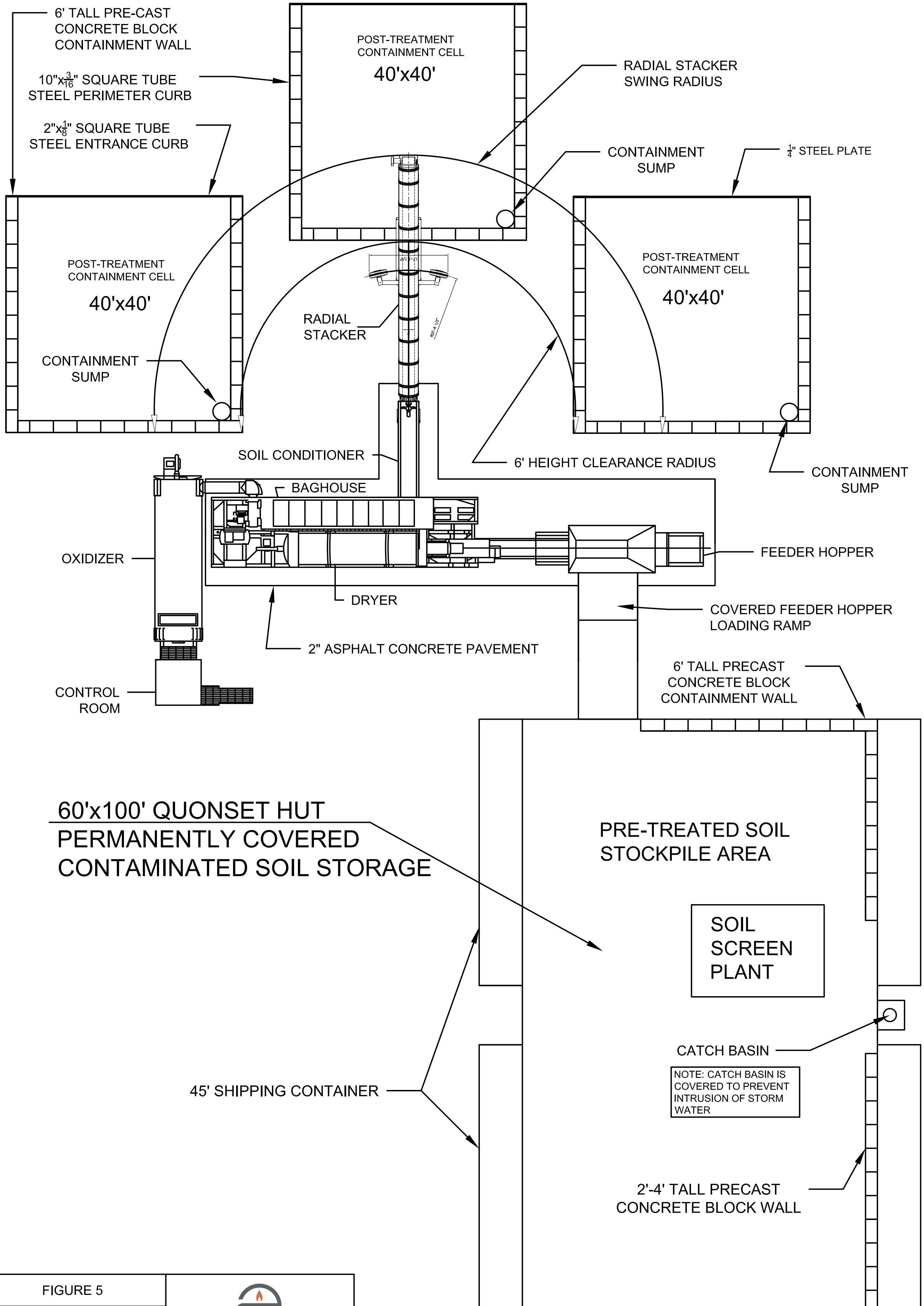

PLAN VIEW

FIGURE 5

SOIL REMEDIATION UNIT
OPERATIONAL LAYOUT

DATE: JUNE 4, 2021
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DRAWN: CS
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Scale 1"=16'

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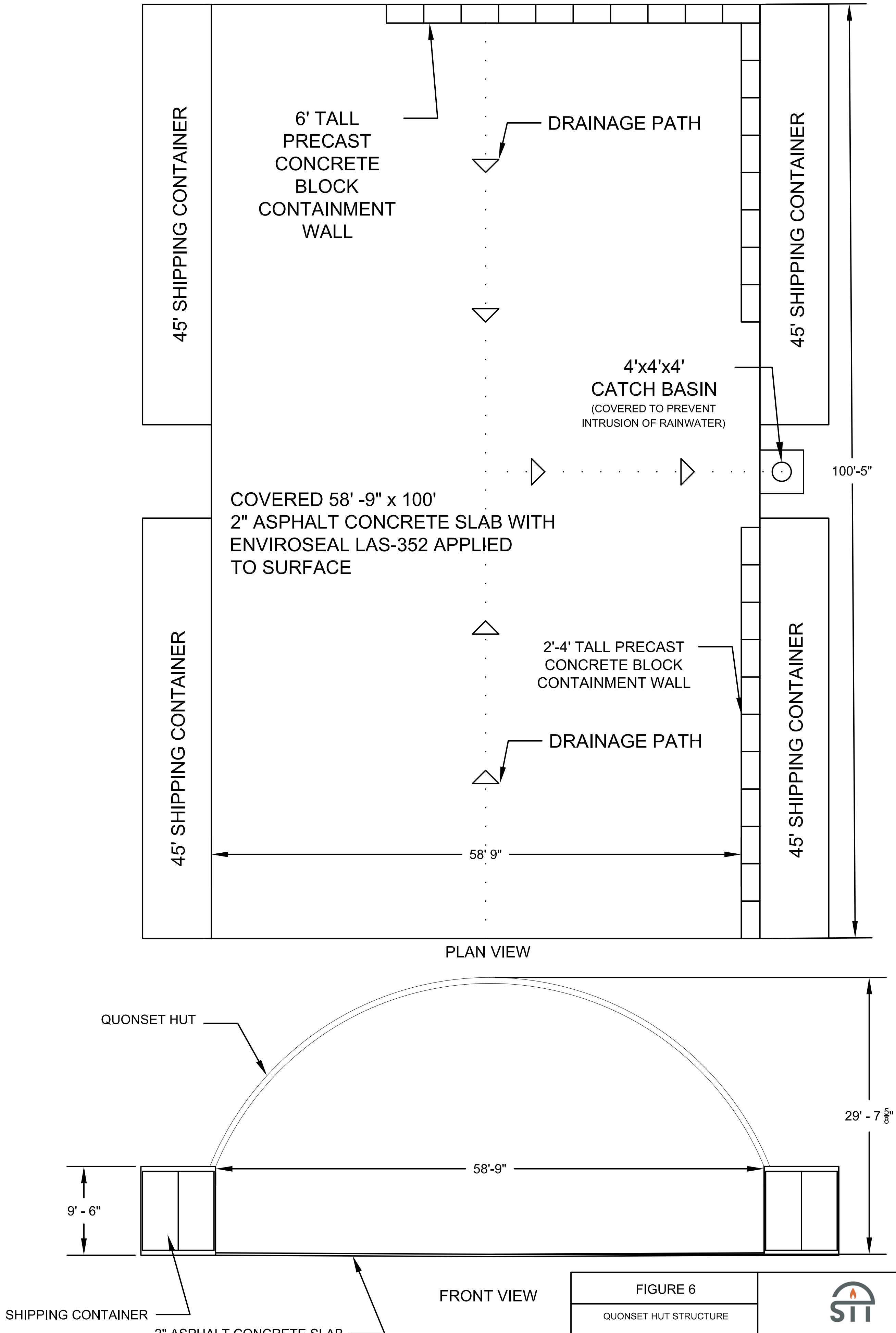

FIGURE 6

QUONSET HUT STRUCTURE

DATE: JUNE 2, 2021
REV.: 1
CHKD: TK
DRAWN: CS
PROJ. No.: 03-000
Scale 1"=10'

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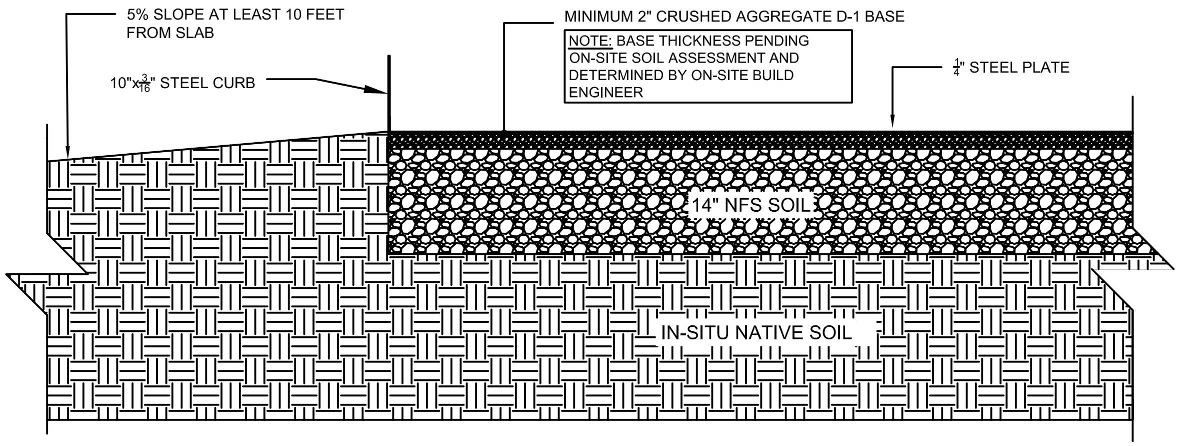
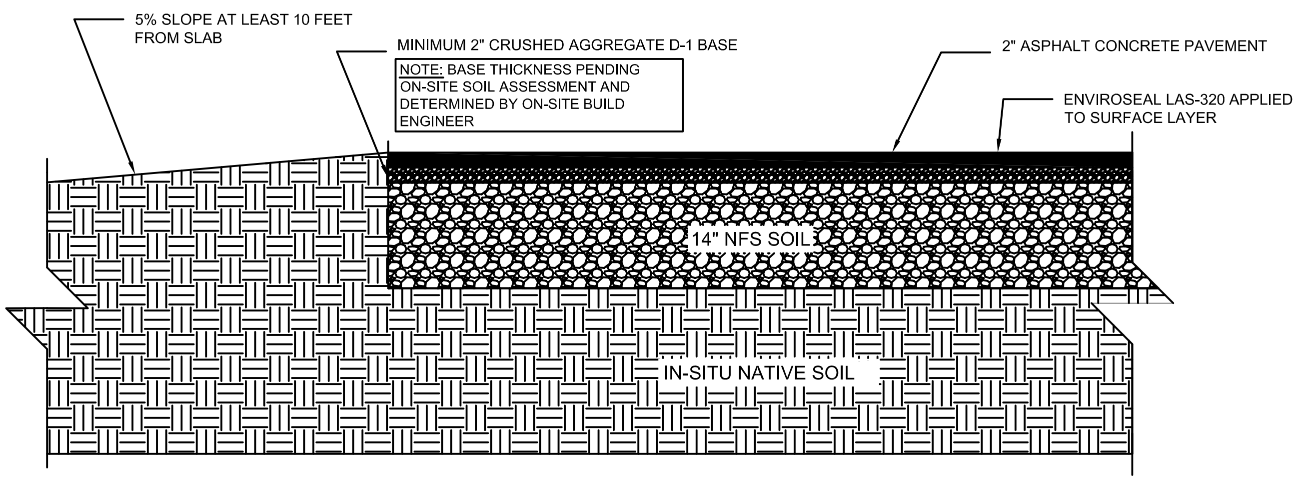
POST-TREATED SOIL CONTAINMENT CELL



SIDE VIEW

Scale 1"=1.5'

PRE-TREATED SOIL CONTAINMENT CELL



SIDE VIEW

Scale 1"=1.5'

FIGURE 7

PRE AND POST CONTAINMENT CELL BASE CONSTRUCTION

DATE: JUNE 4, 2021
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PROJ. No.: 03-000

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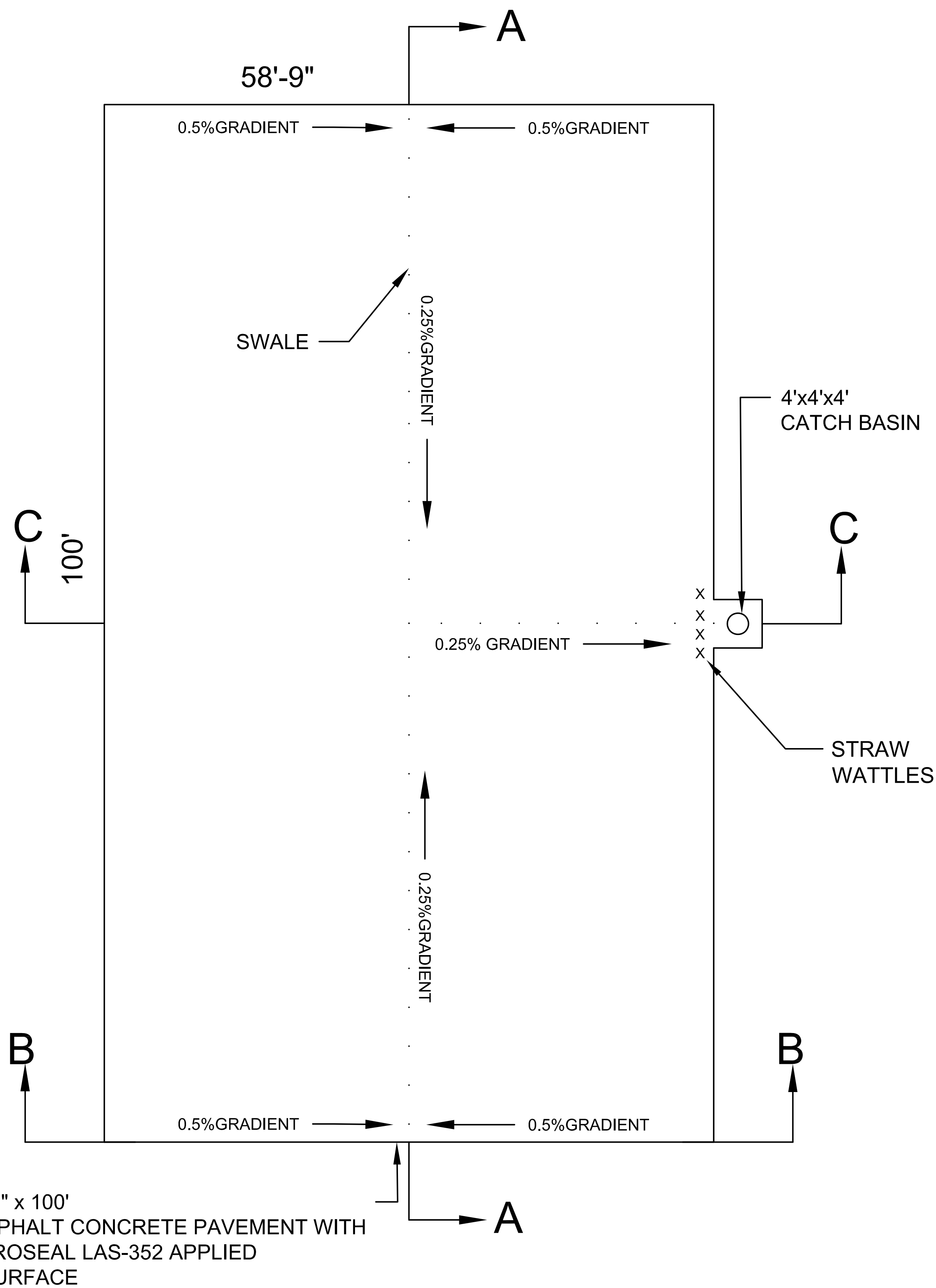

PLAN VIEW

Scale 1"=10'

WATER CAPACITY OF CATCH BASIN = 478 GALLONS
CATCH BASIN IS LOCATED OUTSIDE OF QUONSET HUT. A COVER WILL BE PLACED OVER THE EXPOSED CATCH BASIN AREA TO SHED RAINWATER TO THE SURROUNDING AREA. WATER COLLECTED WILL BE PUMPED INTO A STORAGE TANK PRIOR TO GAC TREATMENT

NOTE: PRE-TREATMENT CONTAINMENT CELL IS PERMANENTLY COVERED. WATER IS SHED TO SURROUNDING AREA OUTSIDE OF CONTAINMENT CELL.

FIGURE 8

PRE-TREATED SOIL CONTAINMENT CELL
WATER COLLECTION PLAN

DATE:	JUNE 4, 2021
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CHKD:	TK
DRAWN:	CS
PROJ. No.:	03-000

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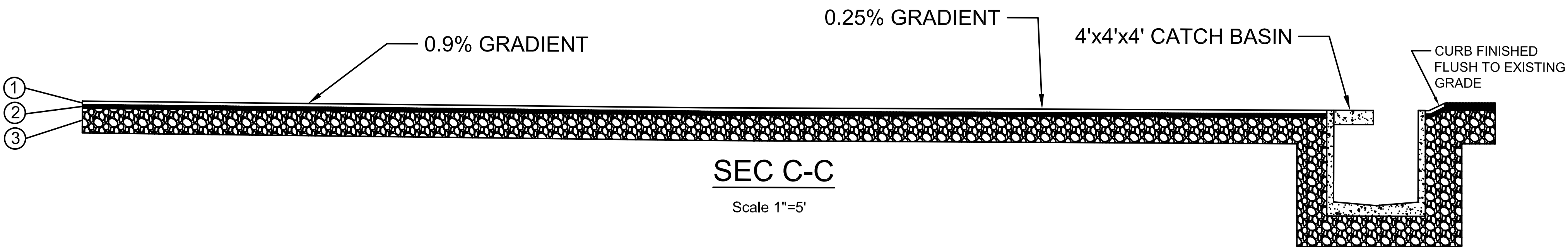
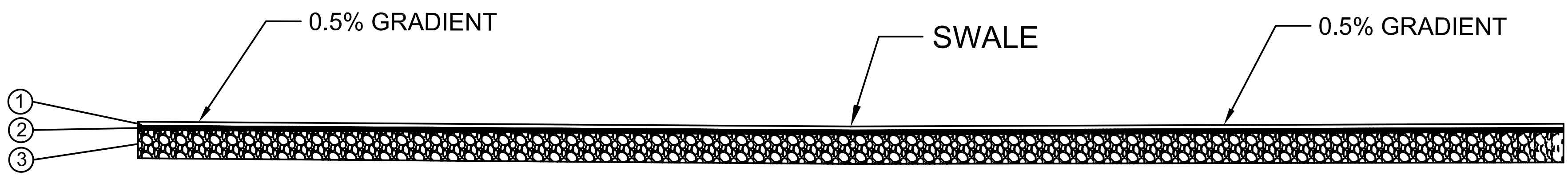


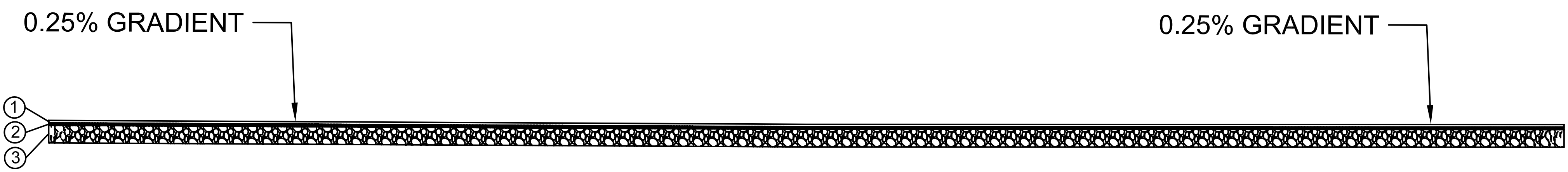
SEC C-C

Scale 1"=5'



SEC B-B

Scale 1"=5'



SEC A-A

Scale 1"=7'

1 — 2" ASPHALT CONCRETE PAVEMENT WITH ENVIROSEAL LAS-352 SEALER
2 — 2" CRUSHED AGGREGATE D-1 BASE
3 — 14" NFS SOIL

FIGURE 9

PRE-TREATED SOIL CONTAINMENT CELL
WATER CONTROL PLAN
X-SECTIONS

DATE:	APRIL 20, 2021
REV.:	-
CHKD:	TK
DRAWN:	CS
PROJ. No.:	03-000

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SOIL TREATMENT TECHNOLOGIES

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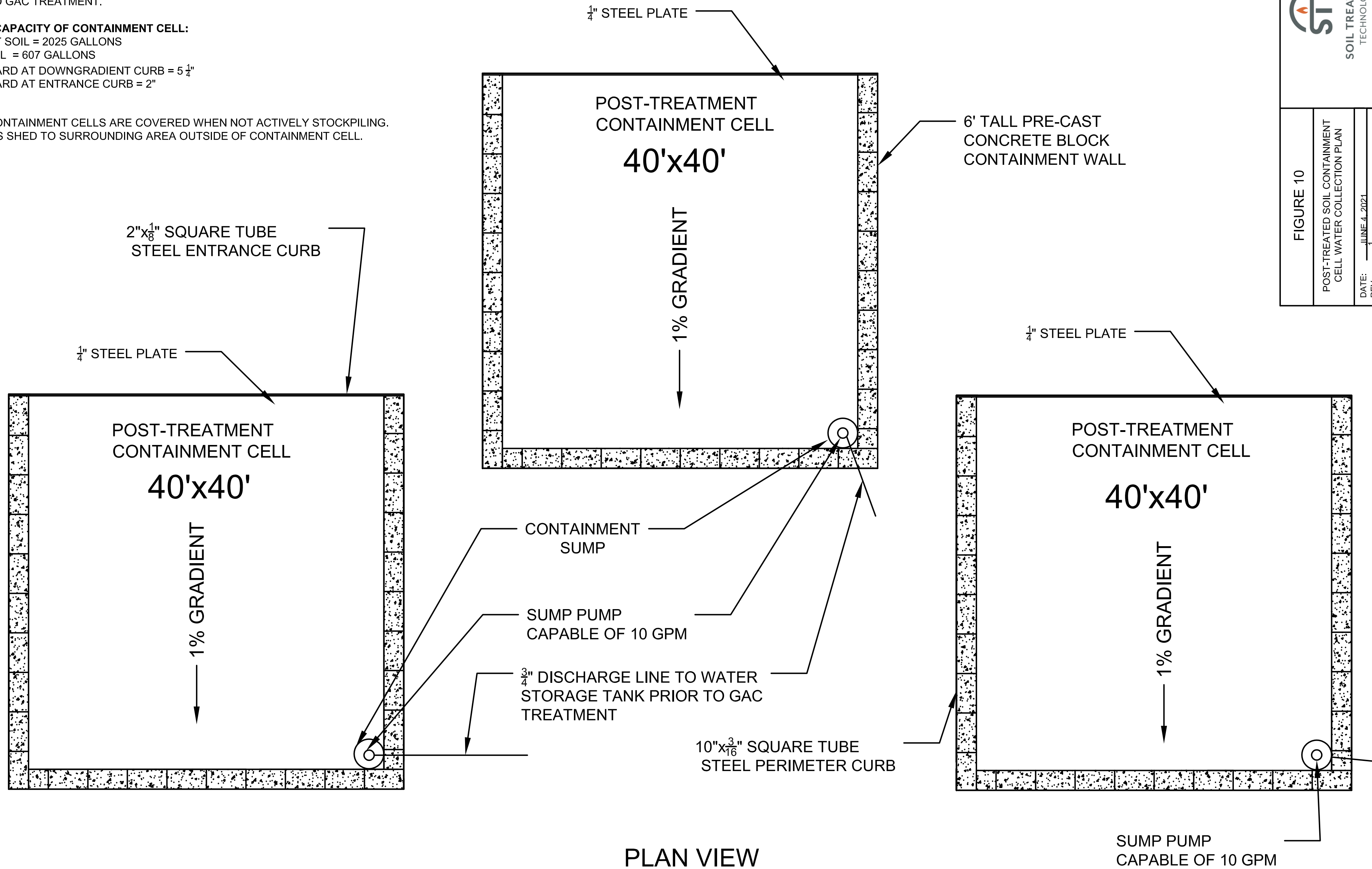
WATER HANDLING DESIGN CRITERIA: 25 YEAR STORM OF 1 HOUR DURATION. INTENSITY OF 0.65 IN/HR. TOTAL EVENT PERCIPITATION VOLUME = 552 GALLONS USE SUMP CAPABLE OF 10 GPM @ 10' TDH - CAPABLE OF REMOVING ENTIRE RAIN VOLUME IN APPROXIMATELY 1 HOUR. WATER IS PUMPED INTO STORAGE TANK PRIOR TO GAC TREATMENT.

WATER CAPACITY OF CONTAINMENT CELL:
WITHOUT SOIL = 2025 GALLONS
WITH SOIL = 607 GALLONS
FREEBOARD AT DOWNGRADIENT CURB = 5 $\frac{1}{4}$"
FREEBOARD AT ENTRANCE CURB = 2"

NOTE: CONTAINMENT CELLS ARE COVERED WHEN NOT ACTIVELY STOCKPILING. WATER IS SHED TO SURROUNDING AREA OUTSIDE OF CONTAINMENT CELL.



PLAN VIEW
Scale 1"=10'

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FIGURE 10
POST-TREATED SOIL CONTAINMENT CELL WATER COLLECTION PLAN

DATE: JUNE 4, 2021
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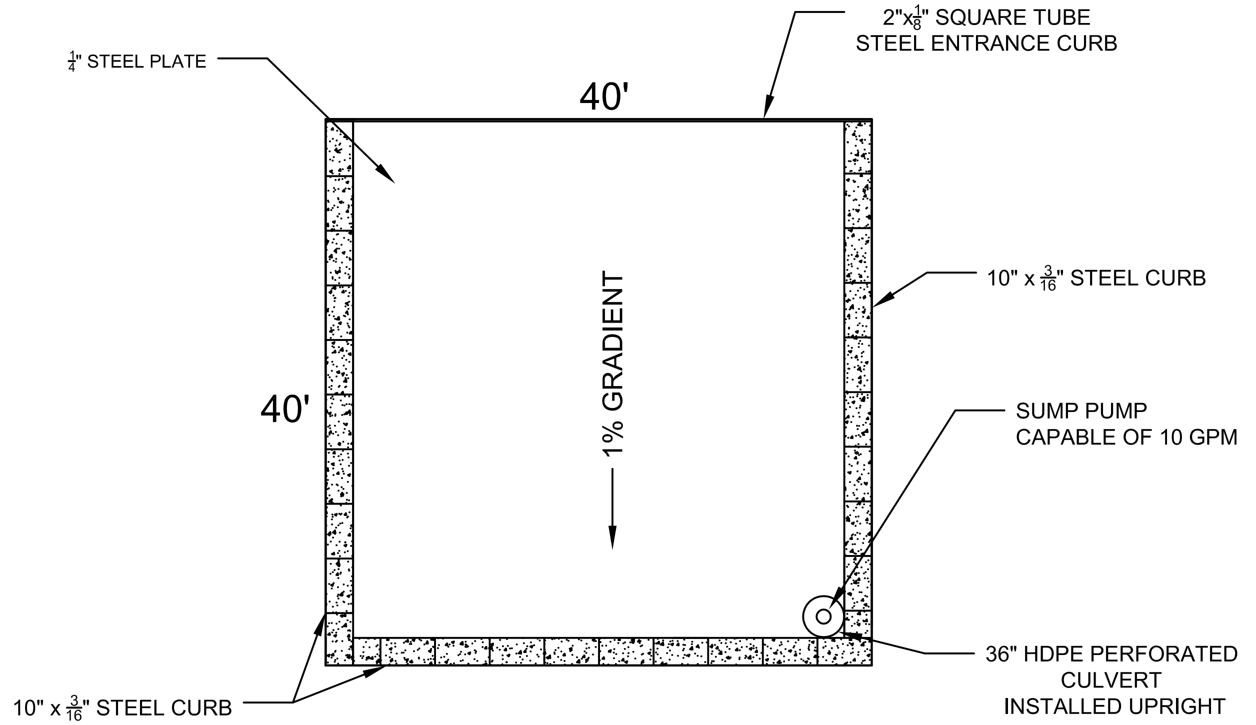
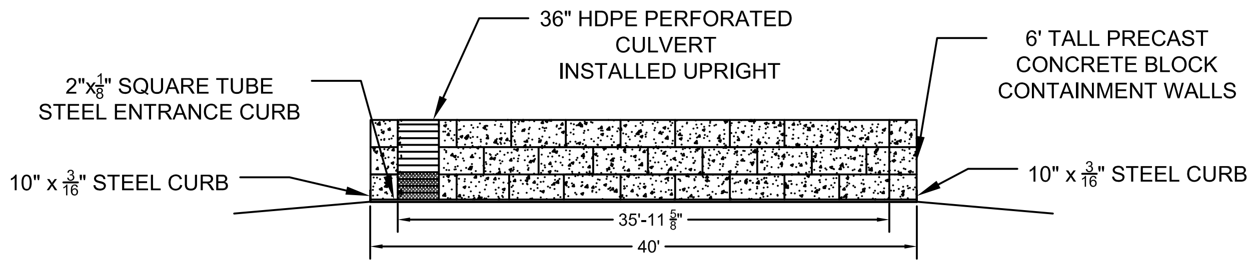
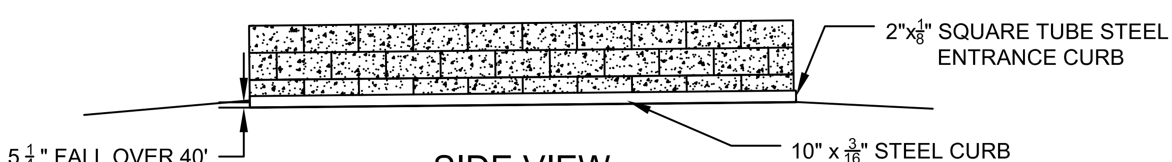
CHKD: TK
DRAWN: CS
PROJ. No.: 03-000



PLAN VIEW
Scale 1"=10'



FRONT VIEW
Scale 1"=10'



SIDE VIEW
Scale 1"=10'

FIGURE 11

POST-TREATED SOIL CONTAINMENT CELL CONSTRUCTION

DATE: JUNE 4, 2021
REV.: 1
CHKD: TK
DRAWN: CS
PROJ. No.: 03-000

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APPENDIX A

ENVIROSEAL LAS-320TM

TECHNICAL DATA SHEET AND INFORMATION

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Enviroseal

LAS-320™

TECHNICAL DATA SHEET

LAS-320™ Will

Protect *Asphalt surfaces from degradation caused by UV or chemical spills.*

Preserve The integrity of asphalt to seal the exposed surface

Provide Resistance to the effects of weathering and oxidization

Easy to Apply

Eco-Friendly Asphalt Sealer

Description: LAS-320™ is a polymeric based fuel resistant asphalt sealer developed to protect asphalt from accidental and premature degradation. It makes a molecular bond with oxidized surfaces and penetrates cracks and eruptions. LAS-320 ™ makes the surface impervious to water and is chemical resistant.

Easy to Apply: Simply pour LAS-320™ on the surface and spread liberally with a push broom or paint roller. Approximate coverage is 80 to 100 square feet per gallon depending on surface condition. Work the LAS-320™ thoroughly into the asphalt surface and brush out all puddles. **Crack Repairs:** Fill cracks ½" or less with sand before application and pour LAS-320™ into the crack thoroughly soaking the sand. Broom out excess material.

- ✓ **Classified as a Fuel Resistant Sealer by the FAA**
- ✓ **Low VOC Rating 94 Grams per Liter**
- ✓ **Environmentally safe – No PAH**
- ✓ **No odor and No tracking**
- ✓ **Repels most liquids and chemicals**
- ✓ **Eliminates HMA degradation and UV damage**
- ✓ **Non-toxic - Non-hazardous - Non-flammable**
- ✓ **Dries quickly- usually less than 30 minutes**
- ✓ **Can be applied with a broom or sprayed**
- ✓ **Coverage rate +/- 100 square feet per gallon**

Contact us for technical assistance
1-800-775-9474 or visit www.enviroseal.com

Formulation Constants

Non-Volatile Solids	+/- 25%
Density	+/- 8.5 (1.019 kg/l)
VOC grams/liter	94 g/l
Ph	+/- 8

PACKAGING
5-Gallons
55-Gallons
275-Gallons

Manufactured in USA by

Enviroseal Corp.
1019 SE Holbrook Ct.
Port St. Lucie, FL, 34952
sales@enviroseal.com
Phone: 772-335-8225
www.enviroseal.com

Enviroseal Corporation

Distributors Worldwide

1019 SE Holbrook Ct.
Port St. Lucie, FL 34952
772-335-8225 - Fax772-335-3991
DUNS: 00-306-7852
Email: sales@enviroseal.com Web: http://www.enviroseal.com

ENVIROSEAL LAS-320
Technical Product Information

DESCRIPTION:
LAS-320 is manufactured exclusively by Enviroseal and is a proprietary formulation. It is a non-asphaltic emulsion seal coat / preservative material that primarily contains inorganic co-polymers. It is an environmentally friendly product that has a VOC (Volatile Organic Content) of 94 grams per liter and does not contain PAH (Poly Aromatic Hydrocarbons) or other harmful chemicals. It dries fast, will not track, and provides long term protection against premature HMA degradation from fuel or UV damage. LAS-320 molecularly bonds with an oxidized asphalt surface extending the life cycle of HMA.

AREAS OF APPLICATION:
LAS-320 can be used to seal Hot Mix Asphalt (HMA) pavement surfaces from weathering, water intrusion, freeze/thaw damage, and provides a fuel-repellant pavement surface. LAS-320 can be applied to a HMA pavement by almost any application method.

PHYSIOGRAPHIC FACTORS:
LAS-320 can be applied with a bituminous distributor, other spray devices, or push brooms by hand. Typical application rates average 100 ft2/p/gal or 2.46 liters/M2 depending upon pavement surface conditions. The sealer is classified as a non-hazardous material by the U.S. Environmental Protection Agency and is nontoxic, non-flammable, and environmentally safe. It can wear off of the surface stones in the asphalt but will remain on and in the asphaltic material. This chemical interaction with the asphalt will prevent the intrusion of petro-chemicals, acid, and water. Applications have lasted in excess of 5 years with minimal color degradation. This degradation is a direct result of surface wear of the aggregate material in the asphalt mix. The protection continues to be effective at elevations below the top wearing surface. Most damage to asphalt surfaces is related UV deterioration and petroleum based fuel spills. LAS-320 was specifically formulated to prevent the destruction from both of these conditions.

DRY TIME
Drying time will vary due to atmospheric conditions, usually from 20 to 40 minutes depending on ambient conditions. Enviroseal recommends that the surface not be used for 24 hours so that the protectorant can cure properly. Striping can be done within the first hour.

SKID RESISTANCE
When additional skid resistance is important, a sand sized aggregate can be combined with the applied mixture. Tests using slag steel sandblasting medium like “Black Beauty” 40 / 60 grit which is very effective and economical to use.

1019 SE Holbrook Ct.
Port St. Lucie, FL 34952
772-335-8225 - Fax772-335-3991
DUNS: 00-306-7852
Email: sales@enviroseal.com Web: http://www.enviroseal.com

APPLICATION TEMPERATURE/CONDITIONS

Normal spray application temperature from 40° f (4.5° c) to 130° f (60° c). Surface must be dry and free of dirt, debris and contaminants that could inhibit adsorption into surface.

LAS-320 SUPPLY/PACKAGING

LAS-320 is supplied in both concentrate and ready to use formulations. The concentrate is mixed one part water to one part LAS-320 concentrate. Packaging is in 5-gallon pails, 55-gallon drums, and non-returnable 275- and 330-gallon IBC poly totes. LAS-320 is shipped from our manufacturing facility in Port St. Lucie, Florida.

SHELF LIFE/STORAGE

Do not store over 130° f (60° c) or below 32° f (0° c). For storage in excess of three months, the product must be agitated. Typical shelf life is one year.

LONG TERM CONSIDERATIONS

Long-term performance studies have shown excellent protection against premature degradation of HMA. In more than two years of US military studies, LAS-320 provides a uniformly black appearance with no noticeable defects and is considered a “Fuel Resistant” (FR) coating by the FAA.

HISTORY

Originally developed by our team of researchers in 1997 and evaluated by US Military for use in airfield applications. LAS-320 has been successfully used since July of 1998 in both Civilian and Military projects. Airfield applications include the Egyptian military, secondary fuel containment on Diego Garcia Naval Air Station, secondary fuel containment at Fort Bliss, Texas, USAF Vandenberg AFB, California, MacDill AFB, Florida, McGuire AFB, New Jersey, NATO AFB, Poland, Toronto International Airport and others.

APPENDIX B

PRE-TREATED SOIL CONTAINMENT CELL HARD SURFACE LOAD DESIGN AND RESULT

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Traffic Data for Design and Historic ESALs

Design Data Input	
Design Construction Year:	2021
Design Length in Years:	5
Base Year:	2021
Base Year Total AADT:	40
Growth Rate % per Year:	0

Historic Data Input	
Historic Construction Year:	
Backcast % per Year:	

% of Base Year AADT for Each Lane

Lane	%
1	50
2	50
3	0
4	0
5	0
6	0

% of Base Year AADT for Each Lane

Lane	%
1	
2	
3	
4	
5	
6	

Truck Category	Load Factor	% AADT
2-Axle (Class 5)	0.50	74.99
3-Axle (Class 6,8)	0.85	12.5
4-Axle (Class 7,8)	1.20	12.5
5-Axle (Class 9,11)	1.55	0
>=6-Axle (Class 10,12,13)	2.24	0

Truck Category	Load Factor	% AADT
2-Axle (Class 5)	0.50	
3-Axle (Class 6,8)	0.85	
4-Axle (Class 7,8)	1.20	
5-Axle (Class 9,11)	1.55	
>=6-Axle (Class 10,12,13)	2.24	

Design Lane AADT:	20
Computed Design ESALs:	23,040

Historical Lane AADT:	
Computed Historical ESALs:	

Construction Year ESAL Calculations

Truck Category	% AADT	Load Factor for Truck Category	ESALs
2-Axle (Class 5)	74.99	0.5	2,737
3-Axle (Class 6,8)	12.5	0.85	776
4-Axle (Class 7,8)	12.5	1.2	1,095
5-Axle (Class 9,11)	0	1.55	0
>=6-Axle (Class 10,12,13)	0	2.24	0
	Total Construction Year ESALs:		4,608

Historical Construction Year ESAL Calculations

Truck Category	% AADT	Load Factor for Truck Category	ESALs
	Total Historic Year ESALs:		

Project Name: Dirt Burner Stockpile Slab
Project Number: 03-000
Pavement Type: New Design

Designer: Connor Swanson
Date: 3/30/2021
Unit: US Customary

INPUT DATA

TRAFFIC DATA

ESALs: 18,250
AADT: 40

UNBOUND LAYERS DATA

Layer	Thickness (in)	P200 (%)
1	2	4
2	16	5

SOLUTION

Predicted Deflection: 0.033 in
AC Thickness: 2 in

ALTERNATIVE STABILIZED BASE DESIGN

Marshall Stability (lbs): 800

Thickness (in)	
Asphalt Concrete	Stabilized Base
1.5	1
2	0

Project Name: Dirt Burner Stockpile Slab | **Project Number:** 03-000 | **Analysis Date:** 3/30/2021 | Project Status

Design Type: New Design | **Designer:** Connor Swanson | **Unit:** US Customary | All layer damages less than 100%.

Project Location:	NIKISKI		Tire Load (lbs) 6000	Load Description:	Single Tire - 80 psi	
				Load Loc (in)		
		Design	Tire Press. (psi)	X:	0	
Design AADT:	40	Loadings	80	Y:	0	
Spring%:	0			Eval Loc (in)		
Summer%:	50	11,520		X:	0	
Fall%:	50	11,520		Y:	0	
Winter%:	0					
Total%:	100	23,040				

Layer		Critical Z Coordinate (in)	Asphalt Properties		Season	Modulus (Ksi)	Poisson's Ratio	Tensile Micro Strain	Compressive Stress (psi)	Million Cycles to Failure	Past Damage (%)	Future Damage (%)	Total Damage (%)
			Air%:	5	Spring	350	0.30	263		1.25		0.00	0.00
Thickness (in):	2	1.99	Asphalt%:	5.5	Summer	300	0.30	206		3.18		0.36	0.36
Name:	sphalt Concrete (Unmodified Asph		Density (pcf)	148	Fall	300	0.30	206		3.18		0.36	0.36
Use TAI:	Yes				Winter	1200	0.30	100		10.56		0.00	0.00
										Total Damage:		0.72	0.72
			Air%:		Spring	40	0.35		62.5	0.09		0.00	0.00
Thickness (in):	16	2.01	Asphalt%:		Summer	50	0.35		66.6	0.15		7.43	7.43
Name:	Aggregate Base P200<6%		Density:		Fall	50	0.35		66.6	0.15		7.43	7.43
Use TAI:					Winter	100	0.35		58.2	2.30		0.00	0.00
										Total Damage:		14.86	14.86
			Air%:		Spring	10	0.45		4.0	5.21		0.00	0.00
Thickness (in):	0	18.01	Asphalt%:		Summer	10	0.45		3.6	6.91		0.17	0.17
Name:	Subgrade P200<30%		Density:		Fall	10	0.45		3.6	6.91		0.17	0.17
Use TAI:					Winter	10	0.45		2.2	34.41		0.00	0.00
										Total Damage:		0.34	0.34
			Air%:		Spring								
Thickness (in):			Asphalt%:		Summer								
Name:			Density:		Fall								
Use TAI:					Winter								
										Total Damage:			
					Spring								
Thickness (in):					Summer								
Name:					Fall								
					Winter								
										Total Damage:			

C:\AKDOT&PF\Alaska Flexible Pavement Design\My FPD Projects\Example - New Pavement.xml

Project Name:	Dirt Burner Stockpile Slab
Project Number:	03-000
Designer:	Connor Swanson
	3/30/2020
Mechanistic Design Type:	New Design
File Path:	C:\AKDOT&PF\Alaska Flexible Pavement Design\My FPD Projects\New Pavement - Dirt Burner.xml

APPENDIX C

CATCH BASIN SUPPLIER BUILD SPECIFICATIONS

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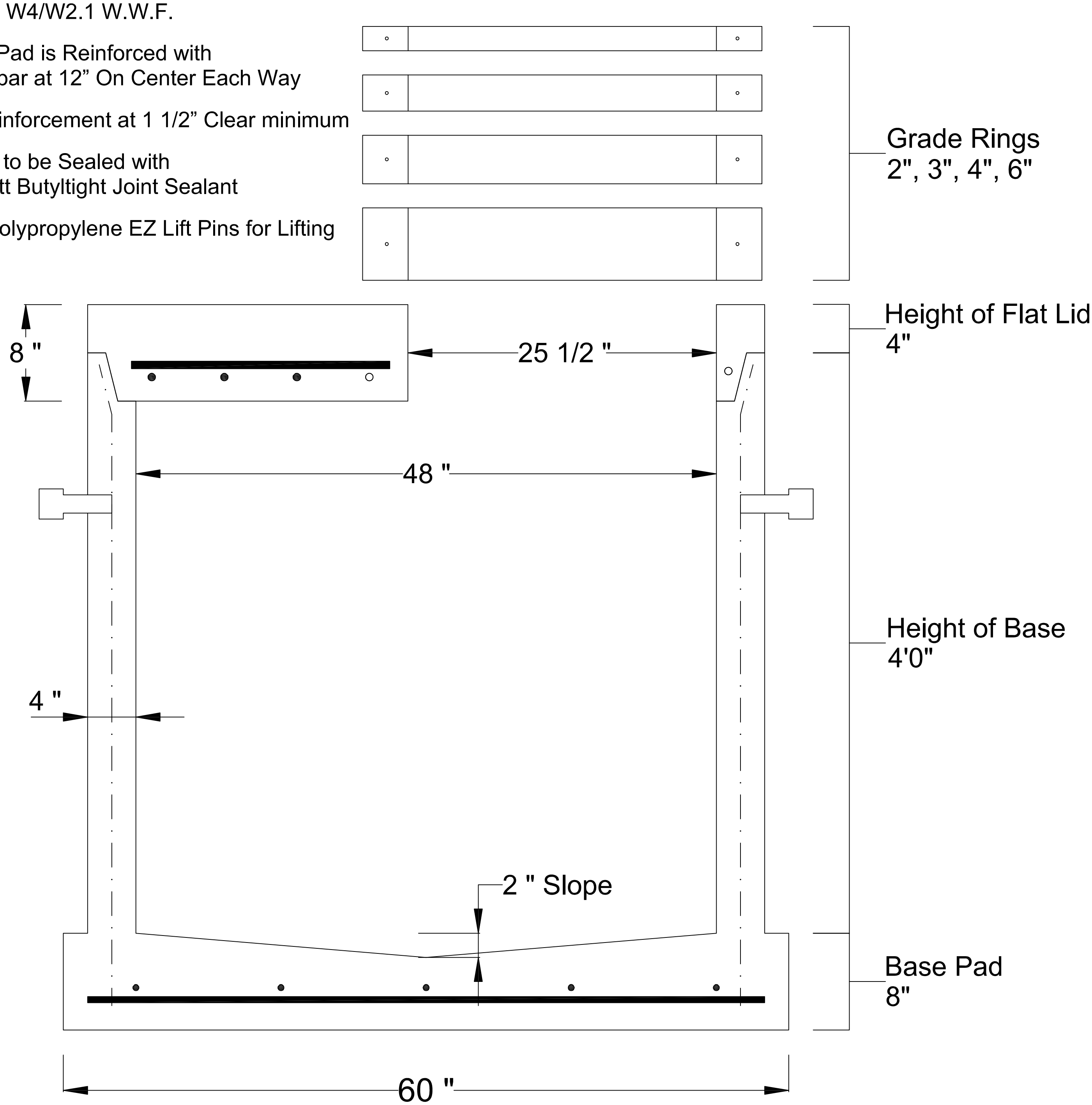
2140 E. 84th Court
Anchorage, AK 99507

D&S
CONCRETE INC.

Phone: (907) 349-6031
Email: dsconcrete@gci.net

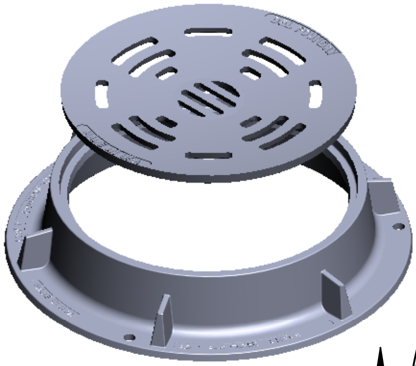
Notes

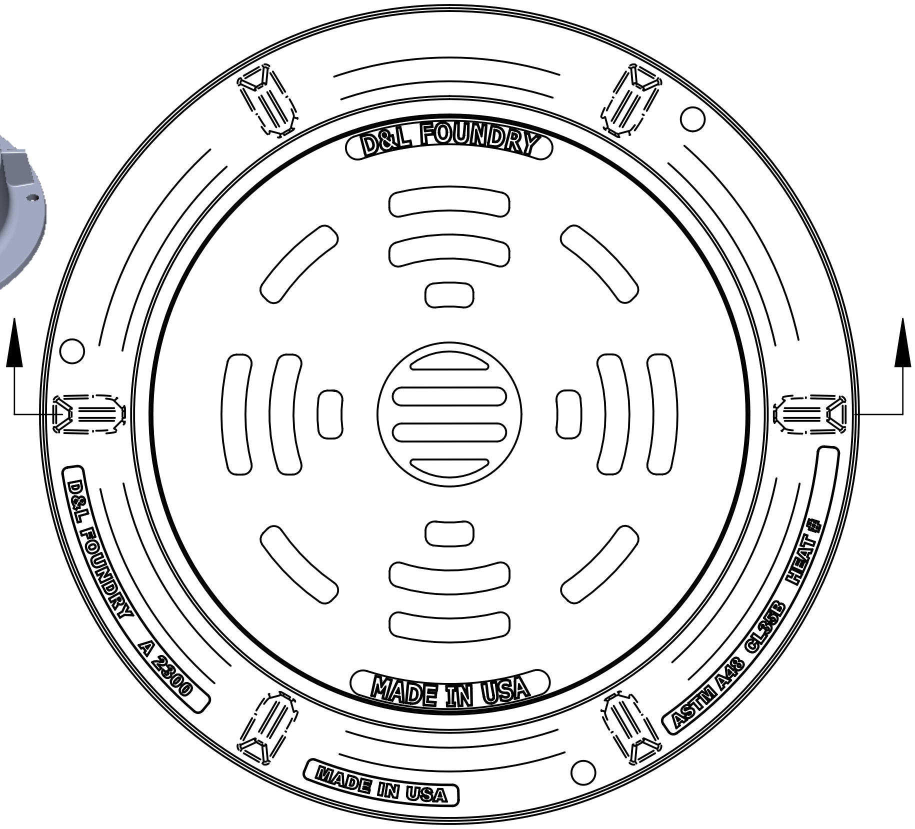
1. Walls are Reinforced with
   4” x 8” W4/W2.1 W.W.F.
2. Base Pad is Reinforced with
   #4 Rebar at 12” On Center Each Way
3. All Reinforcement at 1 1/2” Clear minimum
4. Joints to be Sealed with
   BestFitt Butyltight Joint Sealant
5. Use Polypropylene EZ Lift Pins for Lifting

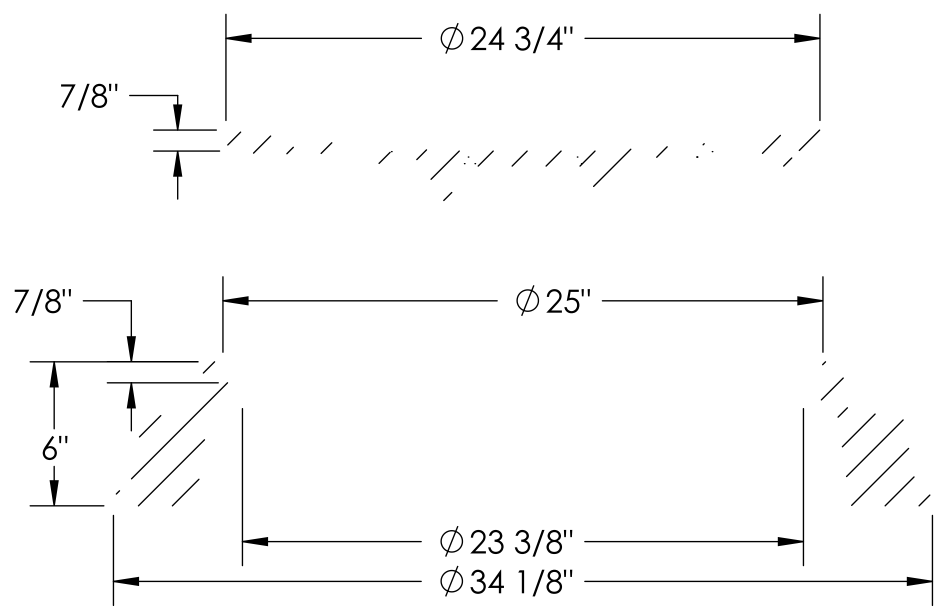


Catch Basin – M.A.S.S. – Type I

All Structure Design Criteria Conforms To or Exceeds A.S.T.M. Designation C478-19







OPEN AREA: N/A	DESIGNATES MACHINED SURFACE	REFERENCE INFORMATION FRAME = 145# GRATE = 95#
DRAWN BY: MRU DATE 03-29-10	VERIFIED BY: DATE	
GREY IRON CONFORMS TO ASTM A-48, CLASS 35B MEETS H-20 WHEEL LOAD	D&L PART #A-2300-R1/C-2300-01 D&L FOUNDRY (NOT TO SCALE) MADE IN USA	**D&L FOUNDRY & SUPPLY** **SALES CONTACT #** **CALIFORNIA** (800)-422-0848 **WASHINGTON** (888)-765-0054 **UTAH** (800)-453-9802

ATTACHMENT 2

BONDING AMOUNT CALCULATION

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Attachment 2
Financial Responsibility Calculations
Soil Treatment Technologies, LLC

SOIL STORAGE		
Item	**Qty.**	**Units**
Contaminated Soil Storage	2000	Tons
Suspect Clean Soil Storage	1200	Tons
Total Soil Storage	**3200**	**Tons**

TRUCKING		
Item	**Qty.**	**Units**
Double Side Dumps	$140	Per Hour
	8	Hr - Round Trip
	$1,120	Per Trip
	40	Tons/Truck
	80	Trips
Trucking Total	**$ 89,600.00**	

SOIL TREATMENT		
Item	**Qty.**	**Units**
Alaska Soil Recycling	$125	Per Ton
	3200	Tons
Soil Treatment Total	**$ 400,000.00**	

Total Financial Responsibility	**$ 489,600.00**

ATTACHMENT 3

SOIL ACCEPTANCE LOG

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Attachment 3
Soil Treatment Technologies, LLC
Soil Acceptance Log

STT Project ID Number	Date	Client Name	Project Name	Signed ADEC T&D Form (initial)	Quantity of Soil (Tons)	Analytical Reports Provided? (Initial)	Analytical Reports Reviewed and Approved (initial)	Metals not Present In Soil? (Initial)	Primary Soil Type